Volume 37 · Part 5 · May 1958

REVIEW OF APPLIED MYCOLOGY

COMPILED FROM WORLD LITERATURE ON PLANT PATHOLOGY AND APPLIED MYCOLOGY

COMMONWEALTH MYCOLOGICAL INSTITUTE
KEW · SURREY

Price 6s. net

COMMONWEALTH MYCOLOGICAL INSTITUTE

MISCELLANEOUS PUBLICATIONS OF THE COMMONWEALTH MYCOLOGICAL INSTITUTE

No. 10. Bibliography of systematic mycology, 1952. 25 pp., 1953. *Price* 3*s*.
No. 11. Bibliography of systematic mycology, 1953–1954. 46 pp., 1955. *Price* 5*s*.
No. 12. The genus Phytophthora. Diagnoses (or descriptions) and figures from the original papers. *By Grace M. Waterhouse*, 120 pp., 66 pl., 11 figs., 1956. *Price* 15*s*.
No. 13. Bibliography of systematic mycology, 1955. 32 pp., 1956. *Price* 5*s*.
No. 14. Bibliography of systematic mycology, 1956. 33 pp., 1957. *Price* 5*s*.

PRINTED IN GREAT BRITAIN AT THE UNIVERSITY PRESS, OXFORD, BY CHARLES BATEY, PRINTER TO THE UNIVERSIT

Chiu (W.-F.), Wang (C.-K.), & Chang (K.-P.). **Factors influencing the development of the Chinese Cabbage 'kwuting'.**—*Acta phytopath. sinica*, **3**, 1, pp. 45–53, 1 fig., 1957. [Chinese. Abs. from English summary.]

Further study of 'kwuting' [**37**, p. 255] at the Peking Institute of Agriculture and Hsingchen Horticultural Experiment Station showed that this strain of turnip [mosaic] virus from *Brassica pekinensis* [Chinese cabbage] and mosaic [virus] of *B. chinensis*, cabbage, and Chinese radish, mixed in varying proportion gave the same symptoms on Chinese cabbage seedlings as the 'kwuting' virus alone, and they would therefore appear to be the same strain. With air temp. 28° C., change of soil temp. over a range of 15–30° affected symptom expression, but more in very susceptible varieties such as Chiaochowpai, than tolerant ones such as Chinpaikou. Also early infection produces more marked symptoms in susceptible varieties than later infection.

Shangtung Nos. 1 & 2, Kungchuling Tamayi, and Hsingchen Tamayi proved highly resistant at both Peking and Hsingchen; Chinpaikou was resistant at Peking but susceptible at Hsingchen. The commercial varieties Heitaoweng and Pantsoutsai are very susceptible.

Steudel (W.) & Blaesen (P.). **Zur Frage der Höhe der Blattlaussaugschäden im Seuchengebiet der Vergilbungskrankheit (Beta-Virus 4).** [On the question of the magnitude of aphid sucking injuries in the epiphytotic area of the yellows disease (*Beta*-virus 4).]—*Zucker*, **10**, 19, pp. 428–432, 1 fig., 1 graph; 20, pp. 445–448, 1 diag., 2 graphs, 1957.

In greenhouse experiments at the Institut für Hackfruchtbau, Elsdorf, Rheinland, Germany, sucking injuries by *Doralis* [*Aphis*] *fabae* combined with beet yellows virus infection [**36**, p. 78] resulted in greater total reduction of root, sugar, and leaf yields, where insect damage was severe, than with either factor alone. The losses are attributed to the enhanced susceptibility to infection induced by arrested development.

Extensive investigations in two heavily infested areas from June to Oct. 1956, a period of very mild yellows infection, revealed max. aphid damage during July–Aug. It is concluded that in localities where the virosis is rife sucking damage must be taken more seriously than elsewhere.

Schlösser (L.-A.) & Koch (F.). **Rassenbildung bei Cercospora beticola.** [Race formation in *Cercospora beticola*.]—*Zucker*, **10**, 22, pp. 489–492, 1 graph; 24, p. 539, 1957.

Evidence is adduced from controlled field experiments in Germany during 1956 that 6 monospore cultures of *C. beticola* differed in pathogenicity to beet [cf. **35**, p. 61 *et passim*]. Plots of the susceptible E and resistant CR varieties [**36**, p. 443] were sprayed with culture suspensions in cool, dry weather on 23 June. On 12 July the first infections were observed on leaves inoculated with Spanish, Italian, Turkish, and Lower Bavarian isolates, in descending order of intensity; after a further 3 and 5 days, respectively, spots developed on plants treated with French and Canadian isolates. During the incubation period the mean diurnal temperature range was 11·1–21·2° C.; it was calculated that the 1st 4 isolates required sum-totals of 300° and the last 2, 360° and 390°, respectively, to produce infection. In the early stages of growth the symptoms of all the isolates were mild, but from mid-Aug. to the end of Sept. severity increased and then gradually declined in Oct. and

Nov. At harvesting the grade of infection on E in a scale from 0 to 5 was 4·5–5 for all the isolates except the Canadian.

The behaviour of the several isolates in culture was not reflected in their field activity. Thus, the Canadian, Italian, and Turkish grew vigorously and sporulated freely, whereas the Spanish was less virulent and the Lower Bavarian remarkably sluggish, producing few spores. Particularly interesting is the fact that the last, after a slow start, caused the heaviest damage of all on the susceptible E, whereas on the resistant CR it was ranked as the least aggressive at the final pre-harvest grading.

Control plots of both varieties were kept practically free from leaf spot until September by fortnightly applications of coprantol at 6 kg./ha.

In the second paper the study is completed by a table giving full details of the laboratory examination of field material.

ZSCHAU (K.). **Die Viruskrankheiten der in Deutschland angebauten Hülsenfrüchte.** [Virus diseases of Legumes grown in Germany.]—Reprinted from *Dtsch. Landw., Berl.*, **8**, 7, 6 pp., 9 fig., 1957. [34 refs.]

This paper from the Biologische Zentral Anstalt der Deutschen Akademie der Landwirtschaftswissenschaften, Berlin, comprises brief notes on the important virus diseases of beans (*Phaseolus vulgaris* and broad bean), peas, and lupins in Germany, followed by a short section on their control.

DEKKER (J.). **Inwendige ontsmetting van door Ascochyta pisi aangetaste Erwtezaden met de antibiotica rimocidine en pimaricine, benevens enkele aspecten van het parasitisme van deze schimmel.** [Internal disinfection of Pea seeds infected by *Ascochyta pisi* with the antibiotics rimocidin and pimaricin, together with some aspects of the parasitism of this fungus.]—*Tijdschr. PlZiekt.*, **63**, 3, pp. 65–144, 17 fig., 4 diag., 10 graphs, 1957. [English summary. 83 refs.]

Some of the information in this important contribution from the Laboratorium voor Phytopathologie, Wageningen, Netherlands, has already been presented [**35**, p. 476; **36**, p. 629]. On the basis of its absorption spectrum in the ultra-violet, pimaricin should be classified among the polyenes or more precisely with the tetraenes, which also include rimocidin. In daylight both undergo a transformation from the fungicidal trans- to the virtually inactive cis-configuration. The compounds were more effective in liquid than in dry or semi-dry form, immersion of the seed in a solution of 75 p.p.m. for 24 hr. reducing the incidence of infection by *A. pisi* from 30–40 to 1–2% in laboratory tests. Similar results were obtained in field experiments, the yield from treated plots being 6 to 7 times as high as that from untreated. Of the 2 antibiotics pimaricin is possibly somewhat more efficient.

The findings of an investigation of Eminent pea seeds to determine the mode of invasion by the fungus and the mechanism of internal disinfection, are that in 80% of the infected seeds the fungus was situated beneath the testa and in about 40% the embryo also was attacked [cf. **36**, p. 480]. Most of the diseased plants arose from embryos which contracted infection only at the time of emergence from the testa, though sometimes the embryo was infected before sowing.

A. pisi is frequently found in symptomless plants. A possible explanation is that the mycelium present in the seed accompanies the apical meristem, leaving behind a 'mycelial chain'. Seeds of symptomless plants may be infected internally by mycelium which was already within them at an early stage.

Spore dispersal in the field is by rain and wind, the average distances reached from a small source of infection (1–4 plants per sq. in.) being 7 cm. in sheltered areas and 20 cm. in open ones. In a more extensive experiment, however, with a focus of 50 diseased plants a distance of 3·5 m. was covered.

It was demonstrated by the extraction of treated seeds that both antibiotics can penetrate into the cotyledon and embryo. The concentrations in the testa and embryo are regarded as high enough to preclude further mycelial growth; occasional partial failures may be attributable to variation in sensitivity of the fungus to the antibiotics or to irregular distribution of the substances through the embryo.

QUANTZ (L.). **Ein Schalentest zum Schnellnachweis des gewöhnlichen Bohnenmosaikvirus (Phaseolus-Virus 1).** [A plate test for the rapid demonstration of common Bean mosaic virus (*Phaseolus* virus 1).]—*NachrBl. dtsch. PflSch-Dienst* (*Braunschweig*), *Stuttgart*, **9**, 5, pp. 71–74, 3 fig., 1957.

This test, used at the Biologische Bundesanstalt, Institut für Landwirtschaftliche Virusforschung, Brunswick, gives clear results at dilutions of the virus up to 1:1000.

Expressed sap is inoculated by rubbing with carborundum on to the surface of a depetiolated, fully-opened, primary leaf of a sensitive variety of *P. vulgaris* (Top-crop in these tests), which is then placed on damp filter paper in a closed Petri dish and maintained at 30 or 32° C. under illumination. In 2–3 days discrete, clearly distinguishable, dark- to reddish-brown spots appear. Later a brownish discoloration of the veins may prevent counting where the lesions are numerous, but it may be useful in distinguishing minute quantities of virus.

THEIS (T.), CALPOUZOS (L.), & CABANILLAS (E.). **The rust reaction of Tropic Wonder and several other pole Beans for the tropics.**—*Plant Dis. Reptr*, **41**, 10, p. 884, 1957.

At the Federal Experiment Station, Mayaguez, Puerto Rico, field observations and greenhouse inoculation tests showed that, contrary to a previous report (*Sth. Seedsman*, **19**, pp. 24–25, 1956), the bean [*Phaseolus vulgaris*] var. Tropic Wonder is very susceptible to rust (*Uromyces phaseoli* var. *typica*) [*U. appendiculatus*: **31**, p. 362]. Bonita is also susceptible but Hawaiian Wonder and Lualualei possess some resistance to the rust collection used.

GROSSMANN (F.). **Über ein ungewöhnlich starkes Auftreten von Ascochyta boltshauseri Sacc. an Bohnen (Phaseolus vulgaris).** [Concerning an unusually high incidence of *Ascochyta boltshauseri* Sacc. on Beans (*Phaseolus vulgaris*).]—*NachrBl. dtsch. PflSchDienst* (*Braunschweig*), *Stuttgart*, **9**, 5, pp. 65–68, 9 fig., 1957.

In the wet summer of 1956 bush beans and sometimes climbing varieties in the Göttingen district were severely affected by *A. boltshauseri* [cf. **26**, p. 276; **34**, p. 568]. Newly emerged cotyledons bore usually round, somewhat sunken, clearly defined spots, on which pycnidia were generally formed in regular, concentric rings. The spots on the foliage were also concentrically marked, partly by 'demarcation lines', and partly by the zonation of pycnidia. In older spots the tissue was often torn. No variety appeared free from infection; Imuna, Longimuna, and Multima, which are resistant to *Colletotrichum lindemuthianum*, seemed particularly susceptible, some crops being devastated.

In a comparative spraying trial with Imuna five applications (each approx. 800 l./ha.) were given at 14-day intervals, beginning with the appearance of the first foliage leaves; orthocide 50 at 0·25% proved superior to the copper and zineb preparations tested but the results were still unsatisfactory, perhaps because of the heavy rainfall over the experimental period. It is concluded that the present German regulations concerning the recognition of clean seed are not sufficiently stringent in respect of this disease, against which no known seed treatment is effective.

KUYAMA (S.) & TAMURA (T.). **Cercosporin. A pigment of Cercosporina kikuchii Matsumoto et Tomoyasu. I. Cultivation of fungus, isolation and purification of pigment. II. Physical and chemical properties of cercosporin and its derivatives.** —*J. Amer. chem. Soc.*, **79**, 21, pp. 5725–5729, 1 graph, 1957.

From the Faculty of Agriculture, Nagoya University, Anzyo, Japan, a description is given of the isolation, purification, and properties of a deep red pigment, 'cercosporin', isolated in abundance from dried mycelia of malt extract-peptone-glucose cultures of *Cercosporina* [*Cercospora*] *kikuchii*, the agent of purple speck of soybean [**35**, p. 861]. Its chemical constitution has been established. Good growth was also made on Raulin-Thom's medium and potato extract-glucose. Spectrum analysis suggests that cercosporin is a polyhydroxy derivative of a polycyclic quinone with an extended quinone system, in which 2 phenolic hydroxyl groups are present in positions *peri* to the quinone carbonyls. The physical and chemical properties of noranhydrocercosporin and its derivatives are given.

ASTHANA (R. D.). **Some observations on the incidence of Uromyces ciceris-arietini (Grognon) Jacz. & Boyer on Cicer arietinum.**—*Nagpur agric. Coll. Mag.*, **31**, 1–4, pp. 20A–20B, 1956–7. [Received Nov. 1957.]

A severe outbreak of rust (*U. ciceris-arietini*) on *Cicer arietinum* [**36**, p. 230] occurred in Seoni-Malwa, India, especially on a local variety (No. 29 mixed with ADV), some crops developing 100% infection within 48 hours. The disease has appeared occasionally before, but caused no great damage. All the varieties cultivated proved susceptible. The cause of the epiphytotic is not known.

GANDY (D[OREEN] G.). **Diseases and disorders.**—*M.G.A. Bull., 1957*, 95, pp. 362–365, 1957.

The results of a questionnaire on the incidence of mushroom diseases sent to growers in Great Britain are tabulated to indicate the frequency and severity of outbreaks, symptoms, and deformities observed in La France disease and similar disorders, and the relation of cultural practices to the incidence of certain diseases. The most serious at present are bacterial spot or blotch [*Pseudomonas tolaasi*: cf. **37**, p. 66], La France disease [loc. cit.], *Dactylium* [*Hypomyces rosellus*: **36**, p. 511], bacterial pit [**37**, p. 66], and yellow moulds [loc. cit.]. The frequency of a disease seemed unaffected by the cultural method used.

BRANAS (J.). **Chronique. Le dépérissement du 22A.Baco dans le Gers.** [Current notes. The withering of 22A.Baco in the Gers region.]—*Progr. agric. vitic.*, **74**, 45–46, pp. 237–243, 1957.

In a further survey of flavescence on vines in France [**36**, p. 302] the vars. Noah, Jurançon, and St. Emilion were found to develop symptoms similar to those on Baco 22; on Piquepout, de Moissac, and Colombard the leaves are crinkled but rarely rolled and there is no golden sheen, a yellow-cream discoloration appearing along the veins and in sectors between; Seyve-Villard 12–375 and 18–315 develop no leaf discoloration. Baco 22A, Noah, 157 Gaillard, and Jurançon are the most susceptible, followed by Folle Blanche and St. Emilion, Colombard and certain hybrids, such as Seyve-Villard 12–375 and Couderc 13, being fairly resistant. The only recommendation the author can make is a change of varieties.

PHILLIPS (D. H.). **Plant diseases in Jersey, 1951 to 1955. 2. Diseases of crops other than the Tomato and the Potato.**—*Rep. States Jersey, 1956*, pp. 45–58, 1957.

This annotated list [cf. **37**, p. 24], based on advisory records, is arranged in 4 sections, dealing with vegetable crops, fruit, ornamentals, and miscellaneous plants.

Phillips (D. H.). **Report of the Mycological Department.**—*Rep. States Jersey, 1956*, 39–44, 1957.

This report [cf. **37**, p. 4] notes, *inter alia*, that common scab (*Actinomyces* [*Streptomyces*] *scabies*) was unusually prevalent on potatoes. A case of stalk break (*Sclerotinia sclerotiorum*), not recorded since 1931, was observed in late June. New records included *Phyllosticta richardiae* on arum lily (*Zantedeschia* [*aethiopica*]), *Didymellina dianthi* on carnations, leaf blight (*Entomosporium maculatum*) [*Fabraea maculata*] on medlar, and brown rot (*Sclerotinia fructigena*) on peach [map 22].

Stations fédérales d'essais agricoles, Lausanne. Rapport d'activité 1956. [The Federal Agricultural Experiment Stations, Lausanne. Report of work in 1956.]—*Annu. agric. Suisse*, (**71**, ed. fr. **58**), N.S., **7**, 7, pp. 607–844, 24 fig., 2 diag., 16 graphs, 3 maps, 1957.

In sections 2 and 6 [cf. **36**, p. 376] it is stated that, in spite of prevailing low temperatures during the year, important attacks of *Puccinia graminis* occurred on Litchi I wheat in the plain of the Orbe, Switzerland. Barley was widely affected by *Rynchosporium secalis* [cf. **33**, p. 149]. In French-speaking Switzerland most of the primary foci of potato blight (*Phytophthora infestans*) [**37**, p. 5] appear on plants grown from affected tubers, usually about 5 June. In untreated fields near Illarsaz 30% of the total leaf surface was so affected by the end of June that it became necessary to burn off the haulms in some fields. In French Switzerland as a whole the epidemic began about 15 July and in 10 days the foliage of certain semi-early, untreated or incompletely treated varieties was destroyed. At Ependes one case of infection by *Erwinia atroseptica* was noted. In the vicinity of Neuchâtel potato foliage was widely infected by *Cladosporium* sp. Heavy losses of Augusta at Baulmes were caused by *Spongospora subterranea*. The commercial value of one lot of Sirtema potatoes was greatly reduced by silver scurf (*Spondylocladium* [*Helminthosporium*] *atrovirens*) [map 233], while tubers of the same lot bore an abundant growth of *Colletotrichum atramentarium* [map 190] but no lesions. In an experiment with potato scab (*Actinomyces* sp.) [*Streptomyces scabies*] at Liddes (Valais), a locality in which heavy infection occurs every year, PCNB at 90 kg./ha. of active material, applied at a depth of 10 cm. immediately before planting, markedly reduced infection in a plot in which beet had been grown previously, but was not effective where potatoes had been planted for 2 successive years. Tubers stored for $3\frac{1}{2}$ months after treatment at 60 or 90 kg./ha. had an unpleasant odour and taste.

Uncinula necator appeared on vines in the Lake Geneva basin and in Valais on about 20 July; damage to the berries was relatively slight but attacks were most serious and widespread on vines treated with organic fungicides against *Plasmopara viticola* [**37**, p. 66].

In trials on Chasselas vines in Caudoz wettable or colloidal sulphurs in association with organo-cupric products (zineb+5% copper and Bordeaux) gave good results against *U. necator*. With captan, however, the same sulphurs, used on the same dates and at the same concentrations, were unsatisfactory. Ordinary sulphurs gave satisfactory control in plots treated with copper products against *P. viticola*, but not in those receiving only captan or zineb.

Favoured by wet conditions during the summer, *Elsinoe ampelina* developed abundantly on mother-vines of Riparia × Rupestris 3309 in Bas-Valais.

Heavy, generalized outbreaks of apple and pear scab (*Venturia inaequalis* and *V. pirina*) occurred in Ticino and French Switzerland. Valais was less severely affected. The ascospores matured early in Apr., the first flight being noted on 16th and a second on 22nd, but the most serious period of infection lasted from 17 to 19 May, when rain fell almost continuously. The first lesions appeared simultaneously in Valais and the Lake Geneva basin between 16 and 22 May and in the Jorat, at 600–800 m., between 26 and 28 May. Rainy weather during the summer favoured

secondary infection, with the result that the disease made constant progress. Owing to the unfavourable weather conditions, materials which were effective against apple scab in 1955 gave only 15–45% control in 1956. Karathane was very effective against apple mildew (*Podosphaera leucotricha*) [cf. **35**, p. 778], even when combined with captan.

Peaches in Ticino were severely attacked by *Megacladosporium* [*Fusicladium*] *carpophilum*, and the disease was observed for the first time in Valais. Two to 4 applications of 0·5% captan at intervals of 18–20 days gave excellent control provided the orchards were brought into a hygienic condition beforehand by cleaning up the branches; otherwise, 4–6 treatments at shorter intervals were necessary. Cherries were again attacked by *Clasterosporium carpophilum* [cf. **32**, p. 301]. Beets were severely affected by yellows virus. A strain of potato virus Y producing conspicuous necrosis again caused important damage to Burley tobacco in the Ticino.

Against *Rhizoctonia* [*Corticium*] *solani* on beets soil disinfection (7 different treatments) was less satisfactory than treatment of the glomerules and had some phytotoxic effects.

MARTIN (E. I.). **Neoplastisches Wachstum bei Sequoiadendron giganteum Buchholz.** [Neoplastic growth in *Sequoiadendron giganteum* Buchholz.]—*Phytopath. Z.*, **30**, 3, pp. 342–343, 3 fig., 1957.

A histological study of sections through an apple-shaped tumour, about 7 cm. diam., on the stem of a 5-year-old *Sequoiadendron giganteum* [*Sequoia gigantea*] is briefly reported. The material was received from the Botanisches Institut, University of Bonn, Germany, and the growth is attributed to infection by *Agrobacterium tumefaciens*.

GRAHAM (D. C.). **Occurrence of soft rot bacteria in Scottish soils.**—*Nature, Lond.*, **181**, 4601, p. 61, 1958.

This study at the Dept of Plant Pathology, East Craigs, Edinburgh, in 1956–7 was undertaken in connexion with black leg of potato (*Erwinia atroseptica*). Seventeen widely different soil samples were examined for the presence of soft rot bacteria by Kerr's technique [**33**, p. 143] and by plating directly on salicin agar [**36**, p. 309] and pectate gel [**36**, p. 458].

A number of isolates, capable of rotting potato tuber slices at 26° C., were obtained from each sample by all 3 methods. Most were *Pseudomonas* spp.

In other experiments heavy suspensions of a mixture of 2 strains of *E. atroseptica* were poured on to 500 g. samples of various soils in jars. Some were buried to the neck in the field from Nov. while others were kept at room temperature. The only soft rot organisms which could be isolated in the following May were *Pseudomonas* spp.

PATON (A. M.). **Pectin-decomposing strains of Pseudomonas.**—*Nature, Lond.*, **181**, 4601, pp. 61–62, 1958.

At the Dept of Bacteriology, Edinburgh, and East of Scotland College of Agriculture, coliform types of pectolytic bacteria could not be detected in the majority of cases of tomato stem necrosis or soft rot, commonly ascribed to *Erwinia carotovora*. *Pseudomonas* spp. [see above] were the most frequent isolates, and at least 1 strain from each tomato specimen was active in rotting tomato stem sections and capable of reproducing typical symptoms in vigorously growing plants. Cucumber, turnip, and potato slices were rotted, and inoculation into healthy potato stems produced a condition resembling black leg. These strains liquefied a 2% pectate gel (A.S.P. Chemical Co.) superimposed on a calcium agar base [**36**, p. 458]. After this observation 400 *Pseudomonas* strains from various sources were screened for active pec-

tolysis on cucumber slices: 5% were classified as active, i.e. they reduced the tissue to pulp after 24 hr. at 27° C. in a Petri dish containing damp filter paper. A further 5% were slower in action, taking 2 days.

SILBER (G.). **Fungitoxicity and phytotoxicity of captan and fungitoxicity of some other compounds containing the N-(trichloromethylthio) group.**—*Diss. Abstr.*, **17**, 6, pp. 1198–1199, 1957.

At Cornell University the ED 50 values of the dosage-mortality data of conidia of *Stemphylium sarciniforme* and *Fusarium sambucinum* were compared for captan and some of its hydantoin and *N*-(trichloromethylthio) imide derivatives by test-tube dilution and slide-germination techniques. Most of the imide derivatives were more toxic to *S. sarciniforme* than the hydantoid derivatives. Within the homologous series toxicity increased as substitution on the 5 position of the hydantoin moiety increased the number of C atoms in the aliphatic side chain from 1 to 4. At 10^{-3} M all the compounds were poor inhibitors of a purified carboxylose preparation *in vitro*. At 10^{-4} M all were approximately equal in their ability to inhibit uptake of oxygen by conidia of *Fusarium*.

Growth of tomato, red kidney bean [*Phaseolus* sp.], maize, and peppermint plants in Hoagland's nutrient solution was inhibited by a supplement of captan (1–10 p.p.m.), tomato being the most affected [cf. **37**, p. 73]. Captan added to the soil also inhibited the growth of tomato, red kidney bean, maize, cucumber, and cabbage raised from seed in fumigated soil, tomato being affected by concentrations as low as 25 p.p.m. (based on dry wt. of soil) and cabbage by 100 p.p.m., while maize and bean were unaffected by concentrations below 400 p.p.m. The solubility of captan in de-ionized water at 25–30° C. was approximately 5–6 p.p.m.

ENGLISH (A. R.), MCBRIDE (T. J.), & LYNCH (J. E.). **PA132, a new antibiotic. II. In vitro and in vivo studies.**—*Antibiot. Ann. 1956–1957*, pp. 676–681, 1957.

It is reported from the Pfizer Therapeutic Institute, Maywood, N.J., that PA132 (from *Streptomyces* sp.) has high activity against a wide range of Gram− and+ bacteria and also inhibits the growth of fungi, including *Alternaria solani*, *Nematospora coryli*, *Sclerotinia fructicola*, *Verticillium albo-atrum*, *Glomerella cingulata*, *Rhizoctonia* [*Corticium*] *solani*, and *Mycogone perniciosa* at 10 μg./ml. and a range of saprophytic moulds at 50– > 500 μg./ml.

MONTEFREDINE (A.). **Recherches sur l'activité chimique des moisissures isolées des grignons d'Olives.** [Researches on the chemical activity of the moulds isolated from Olive oil cakes.]—*Oléagineux*, **12**, 12, pp. 757–759, 1957.

Experiments at the Laboratoire Chimique Provincial, Pescara, Italy, with 14 different moulds [which are listed] isolated from stored olive oil cakes and grown on bean agar+olive oil demonstrated that they are consumers, to a greater or lesser extent, of fatty substances. This explains the reduction in fats that occurs in olive oil cakes during storage. The biggest consumers (36–60% in 23–45 days) were *Gliomastix cartharum*, *Fusarium* sp., *Cladosporium elatum*, *Cephalosporium acremonium*, and *Trichothecium roseum*.

Plant quarantine announcements. Cyprus.—*F.A.O. Pl. Prot. Bull.*, **5**, 11, pp. 177–179, 1957.

Under the Importation of Produce (Control) Order of 10 June 1957 importation of a number of crop plants is prohibited and phytosanitary certification of freedom from a number of plant pathogens is required.

Plant quarantine announcements.—*F.A.O. Pl. Prot. Bull.*, **5**, 12, p. 194; **6**, 2, pp. 27–29, 1957.

A Royal Resolution of 26 Oct. 1956, published in the *Norsk Lovtidend* 39, 15 Nov.

1956 prohibits the importation into Norway of pine plants from the United States and Canada to prevent the entry of *Cronartium harknessii* [cf. **35**, p. 544]. For the importation of potatoes an import licence must first be obtained from the Ministry of Agriculture, and the consignment must be accompanied by a certificate from the plant protection service of the country of origin that the potatoes are not infected by *Corynebacterium sepedonicum* and were grown in an area believed to be free from *Synchytrium endobioticum*.

In the second note full details are given of Plant Inspection Ordinance (Federal Republic of Germany) of 23 Aug. 1957, published in *Bundesgesetzblatt*, **1**, 49, 1957, which consolidates and replaces 35 ordinances, notifications, and orders issued before 31 July 1956 concerning the importation and exportation of plants. The new Ordinance is applicable to Berlin, but not to Saar.

Foreign Plant Quarantine (Mexico) No. 15, of 4 June 1957, published in the *Diario Oficial*, **222**, 37, 1957, prohibits the importation of cacao plants, parts, and organs, and of unprocessed cacao products into Mexico.

Sandhu (R. S.) & Sanwal (B. D.). **Investigations on the nitrogen metabolism of Fusarium lycopersici Sacc. I. Uptake of ammonium and nitrate nitrogen under varying conditions.**—*Phytopath. Z.*, **31**, 1, pp. 13–24, 1957. [German summary.]

At the Dept of Botany, University of Delhi, India, *F.* [*bulbigenum* var.] *lycopersici* (strains R–5–6 and 257) [**37**, p. 113] grew well in liquid culture with KNO_3 or NH_4NO_3 as the N source. With $(NH_4)_2SO_4$ growth in unbuffered cultures was poor and there was a sharp fall in pH to below 3. Addition of small amounts of $-NO_3$ gave some improvement. In cultures buffered with $CaCO_3$ growth also improved. Certain organic acids (0·05 M) increased growth and ammonia utilization considerably; most checked the fall in pH. Inhibition by $(NH_4)_2SO_4$ is believed to result from a toxic accumulation of NH_4 ions in the hyphae. Since NO_3 utilization was not affected by NH_4 salts the NO_3 reduction system of *F. lycopersici* is considered to be different from that of *Scopulariopsis brevicaulis* [**35**, p. 37] which is inhibited by ammonia.

Graniti (A.). **Alcune ricerche alla attività fitotossica dei liquidi colturali di Deuterophoma tracheiphila Petri—I.** [Some investigations on the phytotoxic activity of culture liquids of *Deuterophoma tracheiphila* Petri—I.]—*Phytopath. Z.*, **31**, 1, pp. 25–44, 1957. [German summary.]

At the Eidgenössischen Technischen Hochschule, Zürich, Switzerland, *D. tracheiphila* [cf. **33**, pp. 600–601] was cultured on Scrivani's liquid medium [**34**, p. 33] at 21° C. for 20–35 days. Tomato shoots grown in the culture liquids gave the following reactions: varying degrees of wilt or withering of the leaf edges and interveinal areas; browning of xylem elements in the stem and leaf veins; and wilting of the stem base.

Acidification or concentration of the culture filtrates produced a brown precipitate. The supernatant caused less wilting and blockage of vessels but more severe leaf necrosis. The culture filtrates maintained their activity at 60° for 10 min., but not at 100°; when acidified and concentrated to $\frac{1}{10}$ vol. they could be preserved for quite long periods without much loss of activity.

The sterilized, non-inoculated liquid medium produced similar though much less severe symptoms. This toxic effect was traced to the maize extract used in the medium.

Zogg (H.). **Über die Beeinflussung von Pathogenität und Wachstum pflanzlicher Parasiten. III. Vitamine B_1 und Biotin; Calonectria graminicola; Beeinflussung durch die Temperatur.** [On influencing pathogenicity and growth of plant

parasites. III. Vitamins B_1 and biotin; *Calonectria graminicola*; influence of temperature.]—*Phytopath. Z.*, **31**, 1, pp. 108–111, 1957.

Further studies at the Federal Agricultural Experiment Station, Zürich-Oerlikon [**36**, p. 690] showed, as previously stated [**36**, p. 640], that growth of *C. graminicola* and its pathogenicity to wheat are completely independent.

With increased biotin content of the nutrient solution a real increase of pathogenicity occurs between 9 and 14° C.; between 17 and 20° there is no change, but between 24 and 28° a decrease occurs (inversion). Biotin at 0–5 μg./l. induces a slight increase in pathogenicity with increasing temperatures; at 5 μg. there is a significant increase, between 5 and 50 μg. inversion takes place, and between 50 and 500 μg. a decrease occurs.

Machacek (J. E.). **Prevalence of Helminthosporium sativum, Fusarium culmorum and certain other fungi in experimental plots subjected to various cultural and manurial treatments.**—*Canad. J. Pl. Sci.*, **37**, 4, pp. 353–365, 1 diag., 9 graphs, 1957.

It is reported from the Canada Dept of Agric., Winnipeg, Manitoba, that during 7 years of sampling 62 genera of microfungi were found in the soil of experimental plots [cf. **37**, p. 77]. The 5 saprophytic species *Aspergillus flavipes*, *Penicillium chrysogenum*, *P. intricatum* (the most abundant), *P. restrictum*, and *P. terrestre* accounted for 52·7% of the colonies isolated. *Fusarium culmorum* and *Helminthosporium sativum* [*Cochliobolus sativus*] made up only 0·5%. Soil temperature and rainfall had no effect on the number of fungus colonies, neither did crop rotation nor soil fertilization. As, however, the locality of a plot within the experimental field affected the number of colonies of *P. intricatum* and *P. restrictum*, and the annual occurrence of each was consistent, it is assumed that these 2 fungi are more resistant than the others to antibiotic agencies and are capable of multiplying according to the suitability of the soil habitat.

Ordin (A. P.). Влияние растительности на состав микрофлоры почвы. [The influence of vegetation on the microflora of soils.]—Изв. Акад. Наук СССР [*Bull. Acad. Sci. U.S.S.R.*], *1957*, 4, pp. 495–502, 1957.

Examination at the Microbiological Institute, Academy of Science, U.S.S.R. of soils from different parts of the Kamenii steppes showed that black soils from uncultivated land and forests are characterized by a large number of *Penicillium* spp. and fewer of *Trichoderma* (more prevalent in the forests). *Mucor*, *Rhizopus*, *Fusarium*, *Cladosporium*, *Phoma*, and *Chaetomium* were abundant in the steppe soil.

Saline soil from cultivated land had a higher proportion of *Aspergillus* and *Fusarium* spp. Arable black soil had more fungi, especially *Fusarium*, *Aspergillus*, *Rhizopus*, *Alternaria*, *Cladosporium*, and *Chaetomium* spp., than forest or fallow black soil.

Forest strips, planted as wind breaks, increased the development of *Alternaria tenuis*, *Aspergillus wentii*, *Penicillium restrictum*, *Scopulariopsis* sp., and *Gliocladium* sp. in the land between.

Sabadoš-Šarić (Ana). **Istraživanja o miksobakterijama u tlima Jugoslavije.** [Myxobacteria in different types of soils in Yugoslavia.]—*Rad. jug. Acad. Znan. Umj.* 312, pp. 5–29, 16 fig., 1 graph, 1957. [English summary. 68 refs.]

An account is given of the first investigation of myxobacteria in Yugoslavia, comprising an examination (during 1951–54) of 12 soil types from different climatic regions; 12 spp. were found, some of general occurrence, others confined to certain soil types, and all in the upper 9 cm.

Ohms (R. E.). **A flotation method for collecting spores of a phycomycetous mycorrhizal parasite from soil.**—*Phytopathology*, **47**, 12, pp. 751–752, 1957.

In this method, reported from S. Dakota Agricultural Experiment Station, Brookings, as suitable for spores of a mycorrhizal fungus [**36**, p. 204], 10 ml. of an aqueous suspension of a spore-containing soil sediment is carefully placed in a 50 ml. centrifuge tube containing 10 ml. 50% sucrose at the bottom covered by a layer of 15 ml. 25% sucrose. After 5 min. at 31,000 r.p.m. the spores were in the middle (25% sucrose) layer from which they are removed by sedimentation after the addition of water.

Mujica R. (F.). **Determinaciones micológicas VII and VIII.** [Mycological identifications VII and VIII.]—*Agricultura téc., Santiago*, **14**, 2, pp. 110–112, 1954; **15**, 2, p. 95, 1955. [Received 1957.]

Fusarium moniliforme [*Gibberella zeae*] on maize and *Sclerotinia sclerotiorum* and *Fusarium scirpi* on lentils are among the 7 new fungal records for Chile in 1954.

Aspergillus niger on onion bulbs and *Uredo lupulina* on lucerne were among the 5 fungi recorded as having been found for the first time in Chile in 1955.

Mujica R. (F.). **Estudios sobre esclerotiniosis.** [Studies on sclerotiniosis.]—*Agricultura téc., Santiago*, **15**, 2, pp. 64–74, 5 fig., 1 graph, 1955. [Received 1957.]

At the Departamento de Investigaciones Agrícolas, Santiago, *Sclerotinia sclerotiorum* was identified on 18 different cultivated species from Chile, sunflower being its most important host. Pathogenicity trials proved the resistance of Gramineae to *S. sclerotiorum* and the susceptibility of peas, beans (*Phaseolus vulgaris*), chick peas, lettuce, sunflower, cucumber, clover, and carrots. The development of the fungus in the soil is more rapid with more frequent irrigation and when the sclerotia are placed at lesser depths. Apothecial formation is favoured by soil pH approaching neutral (pH 7·28).

International Code of Botanical Nomenclature adopted by the Eighth International Botanical Congress, Paris, July 1954.—338 pp., International Bureau for Plant Taxonomy and Nomenclature, Utrecht, Netherlands, Dec. 1956. 50*s*.

This volume includes the English, French, and German official versions of the current Code [cf. **32**, p. 101] together with a Spanish translation. Nomina generica conservanda and rejicienda are listed and indexed in Appendix III (pp. 199–293).

International Code of Nomenclature for Cultivated Plants formulated and adopted by the International Commission for the Nomenclature of Cultivated Plants of the International Union of Biological Sciences.—28 pp., Regnum Vegetabile, **10**; International Bureau for Plant Taxonomy and Nomenclature, Utrecht, Netherlands, Feb. 1958. D.fl. 1·25.

The International Code of Botanical Nomenclature [see above] governs the scientific (Latin) names for both wild and cultivated plants. This revised and shortened version of the International Code of Nomenclature for Cultivated Plants, first published in 1953, aims at promoting uniformity and precision in the naming of 'cultivars', an international term introduced for agricultural, silvicultural, and horticultural varieties which, in contrast to botanical varieties, are normally given fancy names (e.g. Cox's Orange Pippin apple).

Nevodovsky (G. S.). Флора споровых растений Казахстана. Ржавчинные грибы. [Flora of the sporing plants of Kazakhstan. Rust fungi.]—432 pp., 1 pl., 257 fig., Academy of Science of Kazakhstan SSR, Alma-Ata, 1956. 24r.15k. [Received 1958.]

This detailed survey of the Uredinales [cf. **37**, p. 215], based on a 10-year investiga-

tion by the author, contains 351 species arranged under host families and genera. Some are new records for Kazakhstan SSR.

Wang (Y.-C.). **Index Uredinearum sinensium.** [List of Chinese Uredinales.]—156 pp., Academia Sinica, 1951. [Received 1957.]

This alphabetical list of Chinese rusts [cf. **30**, p. 490] and their hosts is followed by an alphabetical host list.

Brook (Shirley D.). **Additions to the smut fungi of New Zealand, II.**—*Trans. roy. Soc. N.Z.*, **84**, 4, pp. 643–648, 7 fig., 1957.

Seven members of the Ustilaginales new to New Zealand are described and 10 additional host records noted, making a total of 47 on 68 host species [cf. **25**, p. 364].

Lindtner (V.). **Plamenjace. Grada za kriptogamsku floru Jugoslavije.** [Peronosporaceae. An account of the cryptogamic flora of Yugoslavia.]—*Glasn. Muz. srpsk. Zeml.*, Ser. B, **9**, 153 pp., 8 fig., 1957. [French summary.]

This is a study of the members of the Pythiaceae, Albuginaceae, and Peronosporaceae in Yugoslavia with a description of each species, its hosts, and distribution in the country. Records for Serbia are published for the first time. Species already known in Yugoslavia are revised and some new material is included; at present there are 152 known spp. of Peronosporaceae on 316 different plants. *Peronospora malyi* Lindtner on *Cardamine graeca*, a wild bitter cress used in the Balkans as a vegetable, is described as new.

Dingley (Joan M.). **Life history studies in the genus Hypocrea Fr.**—*Trans. roy. Soc. N.Z.*, **84**, 4, pp. 689–693, 8 fig., 1957.

At the Plant Diseases Division, Auckland, New Zealand, single ascospore cultures [cf. **36**, p. 729] of *Hypocrea atrogelatinosa*, *H. coprosma*, *H. rufa*, *H. schweinitzii*, *H. semiorbis*, *H. tawa*, *H. vinosa*, *H. hunua*, and *H. lactea* [**33**, p. 184] all produced conidia typical of *Trichoderma viride*. The 2 last-mentioned also produced perithecia in culture.

Barr (Margaret E.). **The taxonomic position of the genus Mycosphaerella as shown by comparative developmental studies.**—*Diss. Abstr.*, **17**, 6, p. 1197, 1957.

From a detailed study at the University of Michigan of ascocarp development and structure in 6 fungi the following conclusions were drawn: the development of the ascocarp and the structure of the ascus are characteristics which together permit ordinal separation; in many cases the appearance of the mature ascocarp reflects its mode of development and thus the systematic position; the genus *Mycosphaerella*, typified by *M. punctiformis*, may be divided into 3 subgenera, *Mycosphaerella*, *Didymellina*, and *Cymadothea*, on the basis of morphological characters; and the variable species *M. tassiana* may in the same way be separated into 5 forms.

Bose (S. R.) & Bakshi (B. K.). **Polyporus lignosus Klotzsch and its identity.**—*Trans. Brit. mycol. Soc.*, **40**, 4, pp. 456–460, 1 pl., 1 fig., 1957.

This is an attempt to clarify the confusion between *P.* [*Fomes*] *lignosus* (collected on *Ficus bengalensis* and *Bauhinia purpurea* in the Dehra Dun district, India) and *P. zonalis* [**18**, p. 341], which the authors consider to be 2 distinct species. *Fomes lignosus* is usually parasitic and *P. zonalis* saprophytic; in culture only *F. lignosus* forms rhizomorphs and the hyphae have thinner walls and many septa; and no hyphal fusions occur when the 2 fungi are paired.

Lambert (E. B.). **A technique for transferring inoculum through a flame to reduce contamination.**—*Plant Dis. Reptr*, **41**, 10, p. 903, 1 fig., 1957.

At the Crop Research Division, U.S. Dept Agric., a wing-topped Bunsen burner spreading a thin blue flame over the opening of the bottle has reduced contamination during the transfer of cultures into wide-mouthed bottles. The cotton plugs should be moistened generously with water spray before the transfers are begun.

Rogers (M. N.). **A small electrical hygrometer for micro-climate measurements.**—*Plant Dis. Reptr*, **41**, 10, pp. 897–902, 4 diag., 1957.

Full details of the construction, calibration, and use of a small-sized modification of the Dunmore electrical hygrometer are described from the Dept of Horticulture, University of Missouri, Columbia [cf. **34**, p. 800]. The instrument may be used in still air or in small enclosed spaces; direct R.H. measurements can be made at 0·75 mm. from a leaf surface.

Theis (T.) & Calpouzos (L.). **A seven-day instrument for recording periods of rainfall and dew.**—*Phytopathology*, **47**, 12, pp. 746–747, 4 fig., 1957.

This apparatus is described from the U.S. Dept Agric., Mayaguez, Puerto Rico. A ground-glass plate on the top of a screen containing a hygrothermograph is marked in a circle by a pencil fixed by an arm and compass attachment to a vertical shaft connected with the drum of the instrument and making 1 revolution/week. A dark line is made when the plate is wet and an indistinct line when it is dry. Paradise No. 114 pencils are suitable, a Waterproof in very rainy weather (both Venus Pen and Pencil Co., Hoboken, N.J.). A calibrated chart superimposed on the marked glass records times and duration of wet periods [cf. **36**, p. 415].

Garren (K. H.). **Formulas for pathographs—a proposal for a graph form new to phytopathology.**—*Plant Dis. Reptr*, **40**, 8, pp. 675–680, 2 diag., 1956.

From Tidewater Research Station, Holland, Virginia, a method is proposed for adapting ecological phytographs (polygonal graphs: *Ecology*, **21**, pp. 475–478, 1940) to the interpretation of phytopathological data as pathographs, substituting for the phytosociological characteristics expressed in the former comparable phytopathological characteristics such as abundance, frequency, maturity, severity, &c. The writer sets out tentative formulae whereby numerical expression of these may be obtained for construction of the phytographs, and gives examples.

Sukhov (K. S.). Вирусы. [Viruses.]—370 pp., 2 col. pl., 60 fig., 1 diag., 1 graph, U.S.S.R. Academy of Science, Moscow, 1956. [35 pp. refs. Received 1958.] 24r. 25k.

This book deals with the biochemistry of viruses in general, with emphasis on virus diseases in plants. There are chapters on the physico-chemical characteristics and biochemistry of viruses, the biology of the spread of phytopathogenic viruses, the biology of and the physiological conditions for virus multiplication, genetics of viruses, phylogenetic development of viruses, and pathology of virus diseases of plants and their control (pp. 277–329). A list of Russian literature (4 pp.) is followed by a list of other works.

Crowley (N. C.). **The effect of developing embryos on plant viruses.**—*Aust. J. biol. Sci.*, **10**, 4, pp. 443–448, 1957.

Continuing his investigations [**35**, p. 344], the author attempted to determine whether transitory virus inactivators occur in developing embryos. Tomato embryos with or without endosperm were grown on White's medium (alone and with many modifications) containing tobacco mosaic virus; after 1–12 days the infectivity of the medium was compared with that containing embryos killed by

boiling for 5 min. or no embryos. There was in no case evidence of reduction of infectivity of the medium.

An attempt was also made to eliminate the possibility that a virus-inactivating mechanism might not continue to operate in artificial embryo-culture, 10 embryos being added to each tube daily instead of only at the beginning of the experiment. The results, however, gave no indication of any virus-inactivating activity of the developing embryos.

CROWLEY (N. C.). **Studies on the seed transmission of plant virus diseases.**—*Aust. J. biol. Sci.*, **10**, 4, pp. 449–464, 2 diag., 1957. [73 refs.]

After stating that of the several hundred plant virus diseases so far described only 45 (listed) are seed-borne, the author shows that (1) seed-transmission is not more common in the Leguminosae than in some other families, (2) in only 4 species does it normally exceed 50%, and (3) transmissibility is not a property of any virus or of any host, but is due to an interaction of the two.

Experiments on the effect of bean mosaic and bean yellow mosaic viruses on the fertility of Canadian Wonder beans [*Phaseolus vulgaris*] showed that both slightly reduced the number of seeds/flower, but the reduction was not sufficient to explain the lack of seed-transmission of bean yellow mosaic virus. Though a strain of tobacco mosaic virus from pungent [chilli] pepper (*Capsicum frutescens*) [cf. **32**, p. 7] is seed-transmitted, the embryos are not at first infected, but become so by contamination from the infected testa during germination [cf. **30**, p. 590]. This strain of tobacco mosaic virus did not affect the fertility of chilli, but cucumber mosaic virus reduced it by 50–80%. There was no abnormal pollen. It is concluded that cucumber mosaic virus reduces the seed production of chilli primarily by upsetting the normal hormonal control of plant growth. There was no evidence that the 2 viruses used interfered with host meiosis; as neither is pollen-transmitted some other mechanism must exist, it would seem, to prevent the infection of micro- and macrospores.

Five viruses were used to test for any virus association with the embryo or maturation of the seed: 2 bean viruses of which only 1 was seed-transmitted, viz. bean mosaic virus (43% transmission: Archibald (E. S.), *Rep. exp. Fms Can. 1919*, p. 62, 1921) and bean yellow mosaic, and 3 other viruses chosen because in 1 host of each seed-transmission does occur and in the other it has not been reported, viz., tomato spotted wilt virus in cineraria (96% transmission [**24**, p. 150]) and tomato; cucumber mosaic virus in wild cucumber (*Echinocystis lobata*) (22% transmission, *Phytopathology*, **9**, pp. 326–327, 1919) and cucumber; and tobacco mosaic virus in chilli (22% transmission [**32**, p. 7]) and tomato. To dissect seeds, a small cut was made at the bottom of the fruit or seed, through which the embryo was ejected by pressing with a flattened needle; the tissues were soaked in 10% teepol for some hours to inactivate any virus particles that might be superficially contaminating the tissues, particularly those of young seeds, in which the endosperm is gelatinous and invariably contaminates the other tissues. Teepol was the only satisfactory surface-sterilizing agent found. From these and other experiments evidence was obtained indicating that tomato spotted wilt virus does not infect the embryos of tomato or cineraria. Over 5,000 cinerarias were raised from the seed of plants infected by tomato spotted wilt virus, but not one infected seedling was discovered. With all 5 viruses those that were not seed-transmitted were unable to infect the developing embryos of their hosts; the results indicated that seed-transmission depends on the ability of a virus to infect the embryo, even if (as in chilli) embryo infection occurs during germination.

A glasshouse experiment with Canadian Wonder beans at two temperatures before and after fertilization showed that only the temperature before fertilization exerted any effect on the percentage of seed infected by bean mosaic virus, no

infection occurring when this was under 65° F. This is consistent with the view that even this seed-transmitted virus is unable to infect the developing embryo. With bean mosaic virus and possibly other seed-transmitted viruses seed transmission depends on the ability of the virus to infect the microspores, macrospores, or embryo sac before fertilization.

The only explanation of the rarity of seed-transmission not at variance with the available evidence is Bennett's theory [cf. **16**, p. 226] that most viruses are unable to survive in the micro- or macrospores or embryo sacs. All viruses appear to be unable to infect developing embryos because of their lack of plasmodesmatal connexions with the surrounding tissues. The low percentage of seed transmission where it does occur may be due to the fact that viruses are not present in the nucellar and anther tissues in sufficient concentration to give 100% infection.

Pawlitschek (W.). **Ein Beitrag zur elektronenmikroskopischen Präparationstechnik von Viruspreßsäften aus Pflanzen.** [A contribution to the preparation technique for expressed virus sap from plants for electron microscopy.]—*Naturwissenshaften*, **44**, 9, pp. 285–286, 3 fig., 1957.

The principle of this technique reported from the Institut für Phytopathologie, Aschersleben, is to spray a collodion membrane, floating on water, with centrifuged expressed sap containing virus particles, and to allow time for the mineral salts in the sap to dialyse off. With tobacco mosaic virus in tobacco sap dialysis for 20 hr. removed the mineral salts and left the protein impurities as a cloudy background to the clearly defined virus particles.

Ermoliev (E.) & Prusha (V.). Усовершенствование производства и консервирования диагностических сывороток к растительным вирусам. [Improving the manufacture and preservation of antisera against plant viruses.]—За соц. сельскохоз. Науку [*Socialist. agric. Sci., Czechoslovakia*, Ser. A.], **6**, 4, pp. 333–342, 1957. [English and German summaries.]

As a result of experiments in Kerjkov and Ruzine a method for the preparation of lyophilised antigen of potato virus Y for immunizing rabbits at any time of the year has been perfected. The advantages are that the antigen is in powder form and has to be prepared only once instead of 3 times, the preservation period is much longer though no preservative need be added, it is easier to transport, and simpler to use as it has only to be dissolved in water.

Roland (G.). **La thermothérapie des viroses végétales.** [The thermo-therapy of plant virus diseases.]—*Meded. LandbHougesch. Gent*, **22**, 3, pp. 553–560, 1957. [English and German summaries. 41 refs.]

The author briefly outlines the hot-water and hot-air methods of treating virus diseases in plants [cf. **34**, p. 512; **36**, p. 168, *et passim*] and tabulates and discusses the results obtained in experiments by numerous workers. He concludes that while it is sometimes possible to effect a cure, thermo-therapy in general should be recommended only for the regeneration of entirely affected varieties in order to obtain healthy plants for selection purposes.

Weil (B.). **Thermale Inaktivierung von zwei Pflanzenviren. Ein Beitrag zur Wärmetherapie pflanzlicher Viruskrankheiten.** [Thermal inactivation of two plant viruses. A contribution to the heat therapy of plant virus diseases.]—*Phytopath. Z.*, **31**, 1, pp. 45–78, 8 fig., 1957. [73 refs.]

For these studies at the Institut für gärtnerische Virusforschung, Berlin-Dahlem, tobacco mosaic virus from Samsun tobacco and a strain of *Matthiola* virus 1 [stock mosaic virus] from *Alliaria officinalis* were used. Diluted or undiluted samples of expressed sap in sealed ampoules were placed in a water bath and after-

wards tested on indicator plants. Thermal inactivation curves showed a straight line relationship. Deviation from the corresponding regression curves at various dilutions were attributed to differences in the heat sensitivity of the various components of the virus particles.

With interrupted heat treatment the total time required was shorter, provided that the temperature and duration of the part-treatments were optimal. Where 2 sap samples of different dilution, but producing the same number of lesions, were given identical heat treatment, a longer time was required for the inactivation of the virus in the sample of lower dilution, as also for undiluted sap. It is concluded that indicator plants are unreliable for the measurement of inactivation times at low temperatures. Comparison of inactivation curves for the various dilution levels showed that the thermal inactivation point is lowered by increasing the time of treatment or decreasing the virus concentration. These observations are taken to indicate a 'reconstruction' of the damaged virus molecules in the undiluted sap.

No reactivation by heat of previously inactivated particles was observed. Changes in the characteristics of the virus may be seen after heat treatments.

Orellana (R. G.) & Peiris (J. W. L.). **The swollen shoot phase of the virus disease of Cacao in Ceylon.**—*F.A.O. Pl. Prot. Bull.*, **5**, 11, pp. 165–168, 3 fig., 1957.

In Feb. 1957 cacao trees at the Kandasale Cacao Research Station, Kandy, Ceylon, exhibited stem swelling, with vein flecking and an oak-leaf pattern on the leaves [cf. **33**, p. 581]. Since then the swollen shoot symptom has been noticed on several occasions. Swelling was also found on a bud graft at the Pallekelly Estate, Kandy.

So far, stem swelling has been seen only sporadically, on seedling trees, either on plagiotrophic (fan) or orthotrophic (chupon) branches. While transmission tests remain to be made, the fact that swollen shoots occur only on trees with leaf symptoms analogous to those of swollen shoot in W. Africa leaves little doubt that the virus present in Ceylon is related to the swollen shoot virus strain 1 A (or New Juaben strain) [cf. **27**, p. 178; **36**, p. 385, *et passim*].

In Ceylon both the leaf-symptom phase and the swollen-shoot phase occur. The variety of symptoms on the leaves suggests that more than one form of the virus may be present. Observations indicate that the vein-clearing virus may have mutated into a more virulent strain capable of causing swollen shoot.

Malaguti (G.). **La necrosis del tronco del Cacao en Venezuela.**—*Agron. trop., Maracay*, **5**, 4, pp. 207–226, 4 fig., 1 map, 1956. [English summary. Received 1957.]

At the Centro de Investigaciones Agronomicas a series of field and laboratory inoculations was carried out on 12–18 month cacao plants with *Ceratostomella* [*Ceratocystis*] *fimbriata* [cf. **33**, p. 593; **37**, p. 222]. The results indicated that infection occurs only through wounds. The fact that most lesions occur at branch crotches is due to the presence there of cracks and wounds caused by pruning of suckers, where rain collects. The plants are susceptible at every stage: seedbed infection killed 16% of seedlings before emergence and 38% by cotyledon and shoot infection. Young plants became more resistant after their first year: mortality following inoculation in the first 2 months was 100%, compared with 89% at 12 and 76% at 18 months, when resistant varieties became apparent. The Criollo vars. Chuao, Choroni, and Porcelana were highly susceptible [cf. **36**, p. 233], and the Forastero var. Trinidad highly resistant. Environment was found to have little effect on percentage infection, though humidity shortened the incubation period.

In cross-inoculation tests cacao strains were pathogenic to *Crotalaria*, potato, and to a lesser extent coffee, while 1 isolate from coffee and 1 from *Platanus* were mildly pathogenic to cacao. Cacao isolates from 6 different regions were of equal pathogenicity to cacao. In pot experiments fertilizers did not affect percentage infection.

Owing to the nature of the plantations fungicides are difficult to apply, and the frequent wounding of the trees by harvesting or accidental injury limits their effectiveness. In field tests copper A.C., fermate, dithane Z-78, phygon XL., manzate, agallol, and creolina were without effect on plants pricked by needles and sprayed either before or afterwards with a spore suspension. On plants sprayed with a spore suspension in an aqueous solution of the fungicide they were effective only when the suspension was left to stand for a minimum of 3 hr. Dithane Z-78, phygon XL, semesan, and H 109 had no systemic action against the parasite. Contaminated machetes are the most important cause of spread. The wounds caused when pods are pulled by hand are, however, more susceptible to infection than when they are harvested by machete: 9 of 20 wounds of the first sort in the var. Chorni developed infection after inoculation, compared with 1 of 20 with a machete. *Steirastoma brevis*, which feeds on the young shoots, may be of importance as a vector, but *Scolytus sordidus* is not.

The development of suitable resistant varieties is the most promising method of control. Machetes are recommended for harvesting; pruning and other wounds should be treated with fungicidal paste. Where infection is present in a plantation excessive irrigation should be avoided, weeds should be removed, shade trees should be pruned back to increase aeration, and infected pods burned.

Stewart (D. M.), Cotter (R. U.), & Roberts (B. J.). **Physiologic races of Puccinia graminis in the United States in 1956.**—*Plant Dis. Reptr, Suppl.* 245, pp. 53–60, 1 graph, 1957.

The prevalence and distribution of 25 physiologic races of *P. graminis* in U.S.A. [**36**, p. 686] are discussed and tabulated. On wheat, barley, and grasses race 15B decreased by 16% compared with 1955, whereas race 56 increased by 12%, the 2 races comprising 30 and 31%, respectively, of the total isolates, which also included the 17–29 race group (14%), race 11 and the closely related 32 (13%), 38 (4%), 48A (2%), 15 (1%), and 16 other races and subraces. On *Hordeum jubatum* race 15B was isolated more frequently than races 11, 56, and 38. From barberry 17 races were isolated. Certain wheat varieties were useful as supplemental differential varieties in distinguishing subraces. The *Triticum timopheevi* vars. C.I. 3255 and N.D.3 (C.I. 13159) differentiated 4 subraces of race 11 and (with Tremez Molle) 5 subraces of 15B; C.I. 3255, N.D.3, Towner, and R.L. 3206 differentiated 5 subraces of the 17–29 group.

Conley, Yuma, and Langdon were resistant in the seedling stage to subraces of race 11 and mostly resistant to subraces of the 17–29 group at 65°, 75°, and 85° F.

On oats race 7 comprised 66% of the 476 uredial isolates. Race 7A decreased to 2%; race 2 (with 5) comprised 17% of the isolates; race 8, 14%. Bond was moderately resistant to an isolate from barberry in Michigan, tentatively identified as a new subrace of 1.

Knott (D. R.). **The inheritance of rust resistance. III. The inheritance of stem rust resistance in nine Kenya varieties of common Wheat.**—*Canad. J. Pl. Sci.*, **37**, 4, pp. 366–384, 1957.

This further contribution [cf. **37**, p. 152] deals with the inheritance of resistance to races 15B and 56 of *Puccinia graminis*. All 9 varieties carried the *Sr* 7 resistance gene, 4 carried *Sr* 6 conditioning hypersensitivity, 4 carried *Sr* 9, and 5 *Sr* 10, both conferring moderate resistance to 56. Kenya 338.AC.2.E.2 has in addition 2 dominants (*Sr* 11 and 12) conditioning resistance to 56.

Loegering (W. Q.) & Geis (J. R.). **Independence in the action of three genes conditioning stem rust resistance in Red Egyptian Wheat.**—*Phytopathology*, **47**, 12, pp. 740–741, 1957.

At Beltsville, Maryland, Red Egyptian and Chinese wheat and 3 substitution

lines of chromosomes VI, XIII, and XX [**36**, pp. 93, 521] were inoculated with 3 cultures of *Puccinia graminis* (races 15B, 56, and 29) and maintained at 5 different conditions of light and temperature. In 13 of 15 combinations of culture and environment production by one or other of the substitution lines of aninfection type similar to that on Red Egyptian indicated that only 1 of 3 genes in the latter conditioned resistance. In the remaining 2 combinations there was much greater resistance in Red Egyptian than in the substitution lines, apparently because of an interaction between at least 2 of the genes.

Rowell (J. B.), Olien (C. R.), & Wilcoxson (R. D.). **Effect of dew evaporation rates on infection of Wheat by Puccinia graminis var. tritici.**—Abs. in *Phytopathology*, **47**, 1, p. 30, 1957.

The rate of drying of leaf surfaces after post-inoculation dew periods affected the infection of Little Club wheat seedlings by *P. graminis* uredospores (race 15B) carried in a mineral-oil mixture [see below] when kept in a dew chamber at 70° F. Slow drying for 3 hr. at 65° and near 100% R.H. after a 4-hr. dew period gave 5 times as much infection as quick drying at 65° and 50% R.H. after an 8-hr. dew period. As the drying period increased (up to 3–4 hr.), following a 4- or 8-hr. dew period, so infection increased. Examination of peeled epidermis samples showed spore germination after a 4-hr. dew period to be constant (90+%) and appressorial formation to be so (50+%) after an 8-hr. dew period. Vesicle formation rarely occurred before the end of the drying period, taking place 8–48 hr. after the dew period. Slow drying after 8 hr. dew gave 5–10 times more vesicles and infections than fast drying.

Rowell (J. B.) & Olien (C. R.). **Controlled inoculation of Wheat seedlings with urediospores of Puccinia graminis var. tritici.**—*Phytopathology*, **47**, 11, pp. 650–655, 1 fig., 1 graph, 1957.

From the U.S. Dept Agric. and the University of Minnesota, St. Paul, an apparatus and a technique for inoculation of wheat seedlings with *P. graminis* are described [see above]. Refined, paraffin-oil carriers of the uredospores [**36**, p. 14] were atomized in a special plywood chamber $60\frac{3}{4} \times 36\frac{3}{4} \times 48\frac{3}{4}$ in. in which a series of pots containing 5 uniform wheat seedlings were revolved on a turntable at 80 r.p.m. for some 15 sec. After inoculation at 8.30–9 a.m. the pots were atomized with distilled water and placed in a dew chamber at 70° F., being removed at 5 p.m. to a constant-environment room at 65° to allow slow drying in indirect light [see above].

Spray pattern and deposit were studied on glass with the aid of Dupanol red, an oil-soluble dye, and spore deposition on leaves was also counted. Deposits on seedlings were reproducible with a 15% error between replicate pots (25% between trials on different dates). Infection proved to be directly related to the quantity of spores deposited. The 50:50 mixture of Socony Vacuum mobilsol 100 and U.S.P. light petrolatum, the most suitable of a large number of mixtures tested, had certain adverse effects on infection, reducing the number of appressoria and causing many to form away from stomata, but these effects were constant.

Rowell (J. B.). **Oil inoculation of Wheat with spores of Puccinia graminis var. tritici.**—*Phytopathology*, **47**, 11, pp. 689–690, 1 graph, 1957.

Details are given of the technique used and the results obtained in 1956 from field inoculations with *P. graminis* in oil at the University of Minnesota, St. Paul [see above]. Freshly collected spores in mobilsol 100 were applied with a 2 gal. knapsack sprayer with a teejet No. 730039 nozzle on the evenings of 13 and 15 June. Spore dosage was based on 2,000 spores/tiller, 6 g./gal./acre being used. Dry weather following the 1st inoculation necessitated the 2nd, carried out after rain

and heavy dew on 14 June. The initial outbreak of rust on 22 June, 10–20 pustules/tiller, increased after 2 July, under very favourable conditions, to some 90% severity 2 weeks later.

ALLEN (P. J.). **Properties of a volatile fraction from uredospores of Puccinia graminis var. tritici affecting their germination and development. I. Biological activity.**

FRENCH (R. C.), MASSEY (L. M.), & WEINTRAUB (R. L.). **II. Some physical and chemical properties.**—*Plant Physiol.*, **32**, 5, pp. 385–389, 1 fig.; 389–393, 4 graphs, 1957.

At the Botany Dept, University of Wisconsin, Madison, a fraction stimulating the germination of uredospores of wheat stem rust (*P. graminis* race 56) [see below] was obtained by distillation from the substances released into water by the spores. The original water solutions, which inhibited germination, termed crude inhibitor solutions [**34**, p. 711], produced the stimulant during distillation and simultaneously lost their inhibitory activity.

The stimulatory activity of the distillates was most readily detected when an inhibition by some other agent was counteracted. They overcame the self-inhibition of germination occurring in large spore populations and counteracted the inhibitions imposed by neutral potassium phosphate and by residues left after distillation of inhibitor solutions.

The same distillates modified the rate and extent of germ-tube growth and differentiation. Growth was retarded under a variety of conditions and was almost completely prevented at high concentrations. At concentrations approximating to those retarding elongation the germ-tubes developed a series of structures which were identified as appressoria, substomatal vesicles, and infection hyphae [**26**, p. 482]. Up to 80% of such structures were produced from spores floating on an aqueous solution.

Stimulation of germination, inhibition of germ-tube growth, and differentiation of infection structures were induced at 18° C. either by direct contact of the distillate with the spores or by diffusion across the air gap.

Evidence obtained at the Chemical Corps, Fort Detrick, Frederick, Maryland, from inactivation of the stimulant with various chemical reagents suggests the participation of 2 active substances, 1 possessing a carbonyl and the other a hydroxyl group.

FRENCH (R. C.) & WEINTRAUB (R. L.). **Pelargonaldehyde as an endogenous germination stimulator of Wheat rust spores.**—*Arch. Biochem.*, **72**, 1, pp. 235–237, 1 graph, 1957.

Details are given of the identification of a carbonyl compound, pelargonaldehyde, as a germination-stimulator [see above] for wheat stem rust [*Puccinia graminis*] spores. Relatively little is known of its biochemical or biological activity, though fungistatic and sporostatic effects have been reported by Okazaki & Homma (*J. pharm. Soc. Japan*, **74**, p. 1131, 1954). The stimulator is presumed to arise in the spores through the autoxidation of fat.

CALDWELL (R. M.), SCHAFER (J. F.), COMPTON (L. E.), & PATTERSON (F. L.). **A mature-plant type of Wheat leaf rust resistance of composite origin.**—*Phytopathology*, **47**, 11, pp. 690–692, 1957.

The wheat var. Dual (C.I. 13083), bred at Purdue University and the U.S. Dept Agric., Lafayette, Indiana, is more resistant to *Puccinia recondita* f.sp. *tritici* [*P. triticina*: **35**, p. 596; cf. **36**, p. 640] than its 8 parent varieties (which are listed), though less resistant than the Hussar parent in the seedling stage. It is suggested

that the concurrent usage of several types of rust resistance results in greater overall protection than the use of only 1 type. The rust resistance of Dual is combined with resistance to soil-borne wheat mosaic virus and other valuable qualities.

KENDRICK (E. L.). **The production of teliospores of Tilletia caries in culture.**—*Phytopathology*, **47**, 11, pp. 674–676, 2 fig., 1957.

At the Washington Agricultural Experiment Station, Pullman, in the course of studies of 2 monosporidial isolates from germinating inbred-line spores of race T-16 of *T. caries* [**36**, p. 393] teliospores were produced in culture [**36**, p. 657]. One isolate covered the medium with the normal secondary sporidial growth of a haploid line, teliospores appearing haphazardly on the surface. The other formed only a black spore mass. These spores germinated normally and the cultures were presumably either dicaryotic or diploid.

HOLTON (C. S.) & KENDRICK (E. L.). **Fusion between secondary sporidia in culture is a valid index of sex compatability in Tilletia caries.**—*Phytopathology*, **47**, 11, pp. 688–689, 1957.

Inoculation studies at the Washington Agricultural Experiment Station, Pullman, have given the necessary evidence of the validity of this index of sex compatibility [**33**, p. 146]. All pairs of monosporidial lines where fusion between secondary sporidia occurred were infectious to Red Bobs spring wheat, the experimental host.

PURDY (L. H.). **Differential response of dwarf bunt to seed and soil surface treatment with hexachlorobenzene.**—*Plant Dis. Reptr*, **41**, 11, pp. 916–918, 1957.

It is reported from the U.S. Dept Agric. and the Idaho, Oregon, and Washington Agricultural Experiment Stations that good control was obtained in soil-surface treatment tests for the protection of wheat from dwarf bunt (*Tilletia contraversa*) by applications of 40% HCB [**37**, p. 31] at 10 lb./acre, in both inoculated and naturally infested soil, at sowing, emergence, and 4 weeks later. Application in early March was ineffective. There is a definite relationship to the depth of planting [cf. **36**, p. 93], the greatest damage occurring with shallow sowing, the least with deep planting. Seed treatment with appropriate chemicals is also necessary to reduce spread to uncontaminated areas.

NAUMOVA (Mme N. A.). Применение ультрафиолетовых лучей для диагностики заболеваний семян. [Application of ultra-violet rays for the detection of diseased seeds.]—*Zashch. Rast.* [*Plant Prot., Moscow*], *1957*, 2, p. 44, 1957.

At the Institute for Plant Protection, Leningrad, wheat seed artificially infected by *Ustilago tritici* [*Ustilago nuda*: **35**, p. 598] and some free from infection were subjected to ultra-violet rays from a quartz mercury vapour lamp LUM. 1. The healthy seeds became fluorescent with bluish colour in a few seconds, whereas the infected seeds did not. When the seeds were sown there were no infected plants from the healthy and 68% diseased plants from the infected. Seeds with particularly low germination capacity and those infected by other fungi do not fluoresce.

BRUEHL (G. W.). **Cephalosporium stripe disease of Wheat.**—*Phytopathology*, **47**, 11, pp. 641–649, 2 fig., 2 graphs, 1 map, 1957. [17 refs.]

The results are given of a detailed study at Washington State College, Pullman, of *C. gramineum* on wheat [cf. **37**, p. 33]. A review of the Japanese literature [**18**, p. 387] and an account of the distribution of the disease in Washington is followed by the results of cultural studies which in the main confirmed the Japanese findings, though occasional yellow-orange spore types indicate a somewhat greater variation

than in Japan. In the field the grasses *Agropyron repens*, *Bromus marginatus*, *Dactylis glomerata*, and *Elymus glaucus* were found infected, in addition to wheat and rye; isolates from the grasses infected wheat. In greenhouse inoculations a further 29 grass species of 16 genera proved susceptible.

Infested straw serves as a source of inoculum for at least a year under dry conditions. The fungus enters the plant through the underground parts, spreading upwards in the vascular system. Seed is not often infected, but can serve to spread the disease to new areas. Hypodermic-inoculation trials indicated that spring wheat past the seedling stage and well vernalized winter wheat are more susceptible than young wheat plants. Symptoms in field-grown wheats varied. Columbia wheat proved highly resistant, Kharkof, Burt, and Rio had some resistance, Triplet, Brevor, and Golden were susceptible, and Elgin, Omar, and Elmar intermediate.

Schroeder (H. W.). **Factors affecting resistance of Wheat to scab caused by Gibberella zeae (Schw.) Petch.**—*Diss. Abstr.*, **17**, 3, pp. 473–474, 1957.

At the University of Minnesota Thatcher, Lee, Rival, Frontana, and some other wheat varieties were inoculated with a mixture of spores from 5 races of *G. zeae* at 6×10^6/ml. Resistance to penetration, as estimated from the incidence of infected spikelets after spraying with the suspension, showed Thatcher to be susceptible, averaging 9·9–10·7 infected spikelets. Resistance to the spread after penetration was assessed from the number of infected spikelets following the inoculation of one hypodermically. Thatcher averaged 2–10·1, compared with 1–2·2 for Rival. With the latter, however, this method did not give an accurate picture of the spread, as the fungus could be isolated from apparently sound kernels, indicating tolerance. Aqueous extracts from the ears of resistant varieties contained no substance inhibiting the growth of the fungus. There was no evidence for a correlation between morphological characters and resistance.

Mycelium was found in the rachis of Thatcher both above and below an inoculated spikelet 8 days later, but none was found in the resistant Lee.

The inheritance of resistance to both penetration and spread is apparently determined by multiple genes, susceptibility to the latter being dominant and resistance to the former lacking dominance. While most commercially grown wheat varieties have some resistance, a combination of the 2 types of resistance may be expected to lead to improvement [cf. **35**, p. 668].

Gottlieb (D.). **Take-all of Wheat in Chile.**—*F.A.O. Pl. Prot. Bull.*, **6**, 2, pp. 20–21, 1957.

The first record of wheat take-all (*Ophiobolus graminis*) in Chile was made in 1940 [**23**, p. 475]. In certain areas the disease appears fairly regularly; near Rancagua, for example, losses of 10% are not uncommon and 30% have been recorded. The fungus is widely distributed in the Central valley, the range in longitude being nearly 1,000 km. In the southern part of the valley rotation of wheat and pasture grasses is practised; some of the grasses, such as *Agropyron* and *Bromus* spp., are known to be susceptible, and may play an important part in the perpetuation of the pathogen.

Ponchet (J.) & Coppenet (M.). **Le problème du piétin-échaudage des céréales dans les sols bretons.** [The problem of foot rot and scalding of cereals in Breton soils.]—*Phytiatrie-Phytopharm.*, **6**, 3, pp. 157–164, 1957.

Infection of cereals by *Ophiobolus graminis* [cf. **5**, p. 662; **8**, p. 636; **9**, p. 640; **14**, p. 570] is exceptionally severe in certain soils in Brittany, where it spreads and destroys crops in land newly brought into cultivation and given heavy applications of lime. Dressings of nitrogen in spring reduce the effects of the disease.

Papavizas (G. C.) & Christensen (C. M.). **Grain storage studies. XXV. Effect of invasion by storage fungi upon germination of Wheat seed and upon development of sick Wheat.**—*Cereal Chem.*, **34**, 5, pp. 350–359, 2 fig., 2 graphs, 1957.

At Minnesota Agricultural Experiment Station, in continuation of previous studies [**36**, p. 755], Willet and Henry hard red spring wheats were inoculated with *Aspergillus candidus*, *A. repens*, and *A. restrictus* and stored for periods up to 7 months in desiccators at 25° C. maintained at moisture contents from 14·7 to about 20%. The moulds caused moderate to drastic reductions in germination and considerable development of sick wheat. At a moisture content of 14·7–14·9% *A. restrictus* [see below] was more deleterious than the other species, but at 15–16% *A. candidus* also caused a rapid decrease in germination and abundant sickness. Two isolates of *A. candidus* differed appreciably in the rates of germination reduction and sick wheat development produced at 16–16·4%.

From these results and the prevalence of heavy contamination in all the samples of sick wheat from commercial grain parcels inspected by the writers in recent years, it seems probable that the species under observation are commonly implicated in the etiology of the defect.

Agrawal (N. S.), Christensen (C. M.), & Hodson (A. C.). **Grain storage fungi associated with the granary weevil.**—*J. econ. Ent.*, **50**, 5, pp. 659–663, 2 fig., 1957.

At Minnesota Agricultural Experiment Station replicate samples of Montana-grown hard red spring wheat, infested and uninfested by *Sitophilus granarius*, were stored for 1–3 months at 25° C. and 75% R.H. and tested monthly for 3 months for moisture content and contamination by moulds. Increases in the insect population were accompanied by rises in the moisture content and amount of fungal infection, notably by *Aspergillus restrictus* [see above]. Hyphae and germinating conidia of this species and others of the *A. glaucus* group, including *A. repens*, *A. amstelodami*, and *A. ruber*, were detected in the proventriculus and intestine of the insects and recovered from their excreta, while they persisted until after death in starved individuals.

When surface-disinfected weevils were added to autoclaved grain (8/20 g.) prior to 5 weeks at 85% R.H., the number of colonies of *A. restrictus* had risen to over 5,000,000 by the end of the test, with a corresponding increase in moisture content from 14·9 to 20·8%. The fungus was absent from the insect-free control samples.

Nover (I[lse]). **Sechsjährige Beobachtungen über die physiologische Spezialisierung des echten Mehltaus (Erysiphe graminis DC.) von Weizen und Gerste in Deutschland.** [Six-years' observations on the physiological specialization of the true mildew (*Erysiphe graminis* DC.) of Wheat and Barley in Germany.]—*Phytopath. Z.*, **31**, 1, pp. 85–107, 1957.

Salzmünde Stamm 14/44, Red Fern, Axminster, Normandie, Halle Stamm 13·471, and Schwarzer Persischer were used to differentiate 10 races of *E. graminis* f.sp. *tritici* [**36**, p. 312 and below] among the 240 conidial samples collected during 1950–55.

In 195 samples from central Germany race 4 was the most common, being present in 79 collections, followed by the rather similar race 3, then by the less aggressive races 1 and 2, the aggressive races 7 and 9, and lastly by races 5 and 6. The virulent races 8 and 10 were obtained only occasionally.

For corresponding studies on *E.g.* f.sp. *hordei* the 6 barley varieties used were Weihenstephan CP 127,422, Ragusa b, Weihenstephan 37/136, Weihenstephan 41/145, Rinn 4, and *Hordeum spontaneum nigrum* (or Voldagsen Stamm 8141/44); several mildew resistant mutants of the winter barley Friedrichswerther Berg, for

instance Gatersleben Mutante 511, also proved useful; 16 races were distinguished. Analysis of 165 collections during 1950–55 demonstrated that the group of less aggressive races, A, has evidently lost its prevalence, at least in central Germany, while the aggressive group C has been spreading in the same measure. Groups B and D were found in moderate frequency.

Stephan (S.). **Zur Epidemiologie des Getreidemehltaues (Erysiphe graminis DC.) in Deutschland.** [Concerning the epidemiology of cereal mildew (*Erysiphe graminis* DC.) in Germany.]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F., **11**, 9, pp. 169–177, 8 graphs, 2 maps, 1957.

A detailed study at the Biologische Zentralanstalt, Berlin, of the epidemiology of powdery mildew of cereals (*E. graminis*) [see above] in Germany, based on data covering approximately 30 years, showed that winter barley is of great importance in carrying infection through the winter, as evidenced, *inter alia*, by the epidemic which followed the increased cultivation of that crop, particularly in Schleswig-Holstein, after the first world war, and by the limitation of infection in the brewing barley districts where it is rare. Whether or not an epidemic will develop depends principally on the level of infection on winter barley and on whether the conditions in spring are dry enough to permit a rapid build up of infection. The author considers that if the weather in March is dry a provisional warning could be given of the likelihood of an epidemic.

Dentler (Johanna). **Untersuchungen über die Anfälligkeit von Sommergerstensorten gegenüber Mehltau (Erysiphe graminis DC.).** [Studies on the susceptibility of summer Barley varieties to mildew (*Erysiphe graminis* DC.).]—*Z. Acker- u. PflBau*, **105**, 1, pp. 89–107, 5 fig., 1958. [English summary. 18 refs.]

The following information was elicited by studies at the Institut für Acker- und Pflanzenbau der Technischen Hochschule, München in Freising-Weihenstephan, which were undertaken to determine the reasons for the divergent reactions of summer barley varieties to *E. graminis* with special reference to the influence of heavy K manuring on the course of infection [**33**, p. 23; **36**, p. 313].

The opt. temperature for conidial germination was 18° C. The vitality of the fungus is at its height within a low temperature range, which accounts for the severity of the disease in the early spring [see above].

The pathogenicity of the fungus is weakened by passage through a host heavily supplied with N and strengthened by passage through one treated liberally with K. An anatomo-morphological examination of the leaves revealed a general toughening of the tissue, particularly the cuticle and epidermal wall, in the latter [**6**, p. 156], while excess N resulted in loosening and sponginess of the cell-connexions. Although the number of conidia germinating on the K-treated plants was not reduced, only a few germ tubes gained entrance, the weaker ones failing to penetrate. Hence the repeatedly observed low incidence of infection on summer barley heavily fertilized with K over a period of years [cf. **14**, p. 571]. Nevertheless, such infection as does occur pursues the same course as in other plants. A change in the type of infection develops only should weather conditions adverse to the fungus supervene, when the disease comes to a standstill and the leaves become necrotic or chlorotic.

Barley varieties with semi-complete hereditary resistance, represented in these experiments by *Hord*[*eum*] *tetr*[*astichum*] T4, or complete resistance (Firlbeck III and Lichtis Astra) were found to differ from the susceptible Ackermanns Donaria and Weibulls Herta in the rate of the hyperergic reaction to fungal penetration. This develops immediately in the fully resistant plants and after the formation of a haustorium in the semi-resistant. A particularly noteworthy weakening of virulence in the attacks on the latter variety was achieved by an increase in K which is

ascribed to the combined effects of acquired resistance to penetration and the slower onset of the hyperergic response in the invaded epidermal cells.

TANDON (I. N.). **Control of loose smut of Barley by water soak and chemical methods.**—*Diss. Abstr.*, **17**, 1, pp. 25–26, 1957.

Further results [cf. **36**, p. 641] from Kansas State College are given of a comparison of methods for the control of loose smut (*Ustilago nuda*) in naturally infected seed of spring and winter barley [cf. **37**, p. 157]. No control was obtained below 48° F. The most effective were: 56 hr. at 75° F. in water or 0·2% vancide or 0·01% panogen, and 40 hr. at 80° in water or vancide. Emergence was often lower with water than with vancide, 0·1% spergon was very deleterious, and panogen caused no reduction.

EL-HELALY (A. F.), IBRAHIM (I. A.), & ABO-EL-DAHAB (M. K.). **Studies on Barley stripe and netblotch diseases in Egypt.**—*Alex. J. agric. Res.*, **4**, 1, pp. 71–90, 1 fig., 6 graphs, 1956. [Arabic summary. Received Nov. 1957.]

Studies at the experimental farm of the University of Alexandria during 1950–54, on leaf-stripe (*Helminthosporium gramineum*) and net-blotch (*H.* [*Pyrenophora*] *teres*) of barley proved that they are strongly influenced by environmental conditions and favoured by humidity, both being prevalent in the humid area of the Nile Delta and rare in Upper Egypt. Deep and early sowing were also somewhat conducive to both diseases. Nabawi was the most resistant variety while Baladi 16 was the most susceptible. As isolates of the 2 pathogens were found to differ from those in other countries in certain growth characteristics and in conidiospore measurements it is possible that they are of different races.

Control of *H. gramineum* was obtained by hot water treatment of seed, 51° C. for 3–5 min., or 52° for 3 min., or with agrosan GN, 1–4 g./kg. seed. These treatments and others, however, had no effect on the subsequent secondary infection by *P. teres* on the aerial parts of the plant.

HOOKER (A. L.). **Varietal reaction correlation studies in the Septoria disease of Oats.**—*Agron. J.*, **49**, 11, pp. 600–604, 1957.

For field evaluations at Madison, Wisconsin, and at several varietal nurseries and branch experiment stations in the State, on oat varieties reacting differently to all phases of *Septoria* disease (*Leptosphaeria avenaria*) [**37**, p. 36], most of the plots at Madison were inoculated [loc. cit.] by spraying and hypodermically, but in other localities were exposed to natural infection only. Several isolates of *L. avenaria*, selected for sporulation and pathogenicity, were used as inoculum. In the greenhouse both older plants and seedlings were inoculated. Final notes for leaf infection scores were taken 1–2 weeks after heading; stem infection ratings were taken at maturity.

Significant varietal differences in reaction to the disease on the leaf, stem, glume, and kernel were recorded. It was proved that there was a positive correlation between the various methods of determining varietal reaction to leaf or stem infection, between infection on the leaf, stem, and kernel, and between leaf or stem reaction at different geographical locations; a positive interannual correlation of leaf, stem, or kernel reaction to the disease; and a negative association between leaf or stem infection and heading date.

GRANT (U. J.), RAMÍREZ (R.), ASTRÁLAGA (R.), CASSÁLETT (C.), & TORREGROZA (M.). **Como aumentar la producción de Maiz en Colombia.** [How to increase Maize production in Colombia.]—*Bol. Dep. Invest. agropec., Bogotà*, 1, 51 pp., 16 fig., 1 graph, 1957.

The important leaf diseases of maize in Colombia are rust (*Puccinia polysora*, *P.*

sorghi, and *Angiopsora zeae*) and helminthosporiosis (*Helminthosporium turcicum*) [**33**, p. 282; **35**, p. 166]. Varieties are available combining sufficient resistance to these diseases to avoid heavy loss. Rots of the cob and root caused by species of *Fusarium*, *Diplodia*, *Gibberella*, and *Pythium* are responsible for considerable damage, though there are resistant varieties; a high correlation exists between resistance to stem rot and to cob rot. In Colombia the yellow varieties are somewhat more resistant to cob rots than the white.

Nemlienko (F. E.). Борьба с болезнями Кукурузы в предпосевной и посевной периоды. [Control of Maize diseases during the pre-sowing and sowing periods.]—*Zashch. Rast.* [*Plant Prot., Moscow*], *1957*, 2, pp. 32–35, 2 pl. (1 col.), 4 fig., 1957.

The damage by fungi to stored maize [cf. **35**, p. 602] is reviewed. A severe outbreak of root rot (*Pythium arrhenomanes*) was particularly destructive in northern Caucasus. An 'albino' condition has been shown to be hereditary; immediate destruction of such plants is recommended. The grains from the top part of the cob are stated to be much more susceptible to bacteriosis [*Bacillus mesentericus vulgatus*] and red rot [? *Gibberella zeae*: loc. cit.].

At the Sinelnikov Experiment Station granosan proved the best seed treatment [**37**, p. 161] with mercurane next. The latter gave much better results with seed sown in black soil.

In dry brown humus soil 1 kg./ton granosan, and 1·5 kg./ton mercurane are effective, but in black and podsolized soils 1·5 kg. and 2 kg., respectively, were better.

Pavlov (I. F.) & Kojevnikova (Mme C. M.). Роль шведской мухи в распространении пузырчатой головни. [The role of the Swedish fly in the distribution of blister smut.]—Кукуруза [*Maize*], **2**, 7, pp. 44–45, 1957.

In 1955–6 in Leningrad, Moscow, Ryazan, Orlov, and other areas 90–100% of the maize crops were attacked by the Swedish fly [*Oscinella frit*]. A survey of Voronejkaya 76 in Sept. disclosed that all parts of the plant attacked by the fly were infected by blister smut [*Ustilago maydis*: **36**, p. 758]. The authors consider that the wounds inflicted by the larvae of the fly are the weak spots where the smut spores germinate most quickly. The larvae remain on infected parts of the plants in all stages.

In a field test at the end of July 27% of the plants of the Donski variety attacked by the fly were infected by *U. maydis*, compared with 2% of those not attacked.

Lukashevich (A. I.). Опыт термического обеззараживания семян. [A trial of heat disinfection of seeds.] —*Zashch. Rast.* [*Plant Prot., Moscow*], *1957*, 2, p. 29, 1957.

To prevent blister smut [*Ustilago maydis*: **37**, p. 160] on maize and other cereal smuts seed was treated in special containers with steam at 45° [C.] for 3 hr. or at 47° for 2 hr. In 1955 there was only 0·9 and in 1956 0·24% infection in several regions in U.S.S.R. The treatment should be given every year regardless of the rate of infection.

Cox (R. W.) & Van Nostran (F. E.). **A high-temperature tolerant strain of Helminthosporium turcicum.**—*Plant Dis. Reptr*, **41**, 9, pp. 796–797, 1 graph, 1957.

The unseasonal occurrence of northern leaf blight of maize in the autumns of 1955 and 1956 in a field near Pahokee, Florida, the high temperature tolerance of the associated strain of *H. turcicum* [**35**, p. 763], and its high growth rate in culture indicated that a new strain of the fungus has appeared, which may have practical implications in the maize breeding programme. The opt. temp. for growth of the

Pahokee strain in culture was 30° C., 10° higher than that of an isolate from the Belle Glade area.

Nelson (R. R.). **A major gene locus for compatability in Cochliobolus heterostrophus.**—*Phytopathology*, **47**, 12, pp. 742–743, 1957.

Further studies at N. Carolina State College, Raleigh, of monoascosporic isolates, ascus progenies, and monoconidial field isolates from maize in different geographic areas indicated that the compatibility group factor in *C. heterostrophus* is segregated 1:1 in nature, as has been found *in vitro* [**36**, p. 642]. The results of crossings suggest that the control of the sexual process in *C. heterostrophus* is by a number of gene loci.

Whitney (N. J.) & Mortimore (C. G.). **Root and stalk rot of field Corn in southwestern Ontario. I. Sequence of infection and incidence of the disease in relation to maturation of inbred lines.**—*Canad. J. Pl. Sci.*, **37**, 4, pp. 342–346, 3 fig., 3 graphs, 1957.

Investigation of root and stalk rot [unspecified] of maize [**32**, p. 479] at the Canada Dept Agric., Harrow, Ontario, showed that the stalk rot phase of the disease appeared first on inbreds of early maturity, then on those of medium maturity, and last on those of late maturity, and only after the root system was nearly totally diseased. As it is possible to have rotted roots but no evidence of stalk rot, it is indicated that evaluation of stalk rot resistance should be based on root necrosis ratings.

Williams (L. E.). **Effects of some materials on Stewart's bacterial wilt of Sweet Corn when applied as seed treatments.**—*Plant Dis. Reptr*, **41**, 11, pp. 919–922, 1957.

In further studies at Ohio Experiment Station [cf. **36**, p. 398] streptomycin, terramycin, tetracycline, indoleacetic acid, 2,4,5-T, and sodium borate applied to maize seed in water solution or suspension reduced infection by Stewart's bacterial wilt [*Xanthomonas stewarti*: **36**, p. 241], but the strengths required were phytotoxic.

Kelman (A.), Person (L. H.), & Hebert (T. T.). **A bacterial stalk rot of irrigated Corn in North Carolina.**—*Plant Dis. Reptr*, **41**, 9, pp. 798–802, 5 fig., 1957.

A Gram— bacterium, probably an undescribed *Erwinia* sp., was isolated from diseased maize at several places where extensive overhead irrigation was practised. Leaf and stem tissue was invaded, becoming tan to brown and water-soaked, and the plants toppled over at the point of infection. Parenchymatous tissue was rotted and affected portions of the leaves were shredded. Symptoms were reproduced on maize inoculated in the greenhouse and the bacterium was reisolated; it also caused a pith decay of inoculated tobacco and a soft rot of potato tubers, carrot, squash, cucumber, cabbage, and onion.

Berger (K. C.), Heikkinen (T.), & Zube (E.). **Boron deficiency, a cause of blank stalks and barren ears in Corn.**—*Proc. Soil Sci. Soc. Amer.*, **21**, 6, pp. 629–632, 2 fig., 1957.

In the greenhouse at the Wisconsin Agricultural Experiment Station, Madison, maize plants grown in nutrient solutions containing 0–0·05 p.p.m. B produced no ears or only poorly developed barren ones, while full growth was attained when plants were allowed to reach maturity at 0·025 p.p.m.

In the field side-dressings of 'fertilizer borate', containing 13·6% B, applied in bands 18 in. wide when the plants were 1 ft. high, resulted in significantly increased yields (up to 30 bush./acre) in 6 (11%) of the 54 fields harvested and reduced the number of blank stalks, e.g., from 24·8 to 7·8%. The critical level of B in the upper leaves appeared to lie between 11 and 13 p.p.m.

Atkins (J. G.) & Adair (C. R.). **Recent discovery of hoja blanca, a new Rice disease in Florida, and varietal resistance tests in Cuba and Venezuela.**—*Plant Dis. Reptr*, **41**, 11, pp. 911–915, 2 fig., 1957.

Further details are given concerning the discovery of 'hoja blanca' in Florida in Aug. 1957 [**37**, p. 163]. Many of the resistant varieties [loc. cit.] are undesirable because of agronomic or grain characteristics or their susceptibility to blast (*Piricularia oryzae*). All the United States long grain and the commonly grown short grain varieties are susceptible to 'hoja blanca', but certain minor short- and medium-grain varieties such as Colusa, Asahi, Lacrosse, and Missouri R-500 are resistant, and Arkrose moderately so. Their resistance originates from short-grain types, but it should be possible to introduce resistance into all grain types.

Malaguti (G.). **La 'hoja blanca', extraña enfermedad del Arroz en Venezuela.** ['Hoja blanca', a foreign disease of Rice in Venezuela.]—*Agron. trop., Maracay*, **6**, 3, pp. 141–145, 1 fig., 1956. [Received 1957.]

Malaguti (G.), Díaz C. (H.), & Ángeles (N.). **La virosis 'hoja blanca' del Arroz.** [The virosis 'hoja blanca' of Rice.]—*Ibid.*, **6**, 4, pp. 157–163, 1 fig., 1956. [English summary. Received 1957.]

The symptoms of 'hoja blanca' [see above] are described in detail. The authors believe the virus to be closely related to rice stripe virus, but there are root symptoms not described for rice stripe: some of the roots are white but many have a chestnut discoloration, limited to the cortex, first appearing as reddish bands alternating with healthy tissue. Many bacteria are present in the discoloured parts. These root symptoms recall those of bakanae disease (foot rot) [*Gibberella fujikuroi*], but that pathogen was not present.

The disease first appeared in Venezuela in 1956 in the var. Toro. It is now present in most parts of Estado Portuguesa, 25–40% of plants being affected in some regions. All varieties grown there are susceptible. Percentage infection was in general related to the abundance of leaf hoppers in the field, and laboratory experiments established 2 [unidentified] leaf hoppers as vectors. The disease was not transmitted by seed or by the mechanical inoculation of infected sap.

Suryanarayanan (S.). **The 'blast' disease of Rice (Piricularia oryzae Cav.).**—*J. Madras Univ.*, **26**, B, pp. 649–657, 4 fig., 1957. [20 refs.]

A general account of the disease and the pathogen.

Atkins (J. C.). **First report of the bakanae disease of Rice for U.S.A. and preliminary studies on growth stimulation by cultural filtrates.**—*Plant Dis. Reptr*, **41**, 10, p. 860, 1957.

At the Rice Pasture Experiment Station, Beaumont, Texas, diseased rice seedlings scattered throughout the field showed symptoms similar to those of the bakanae disease (*Gibberella fujikuroi*) in Japan [**17**, p. 769]. *Fusarium* sp. was isolated from necrotic basal tissues. Culture filtrates added to soil in beakers containing sprouting rice seeds produced up to 77% increase in the height of the seedlings.

Vámos (R.). **Chemical examination of the water of flooded Rice fields.**—*Nature, Lond.*, **180**, 4600, pp. 1484–1485, 1957.

Analyses made at the University of Szeged, Hungary, to determine what nutrient ions were present in the water of rice fields at the time of the appearance of 'brusone' disease [**29**, p. 582; **31**, p. 513] showed the water of affected fields to be deficient in phosphate, sulphate, nitrate, and Mn; ammonium and Fe were absent, or present only in minute quantities. Water of unaffected fields was similar. The

disease is therefore ascribed to the fact that affected plants depend on their adventitious roots for the uptake of nutrients and are able to utilize only the nutrients dissolved in the water, whereas healthy plants have deep roots in the soil.

Tessi (J. L.). **Variedades de Sorgos resistentes a las bacteriosis.** [Varieties of Sorghum resistant to bacterioses.]—Abs. in *Idia*, **8**, Oct.–Dec., pp. 34–35, 1956.

A report from the Instituto de Fitotecnia at Castelar, Argentina, gives Cody, Ellis, Dais, Leoti × Atlas, Sorgo de Guatrache, and Nebraska No. 63 as the most resistant to *Pseudomonas andropogoni* [**33**, p. 668]; Cody, Milo S.A. 7114, Ellis, and Milo S.A. 7097 to *Xanthomonas holcicola* [loc. cit.]; and Club × Day No. 16, Cody H.C. 39–142, Cody H.C. 39–140, Ellis, and Wheatland to *P. syringae* [loc. cit.].

Fletcher (W. A.). **Citrus varieties and rootstocks for New Zealand.**—*Orchard. N.Z.*, **30**, 10, pp. 33, 35–36, 1957.

Citrus virus diseases so far found in New Zealand comprise tristeza [**35**, p. 236], stem-pitting [a strain of tristeza virus], scaly butt [exocortis virus: cf. **36**, pp. 317, 760], psorosis, and shell bark [cf. **36**, p. 693]. The grapefruit vars. Wheeny and New Zealand appear to show no symptoms of stem-pitting, though the disease occurs in grapefruit; very severe pitting was observed on Morton citrange ([*Poncirus*] *trifoliata* × sweet orange) used as a rootstock for Carter navel orange. Pitting of lime and trifoliata rootstocks has also been noted. The form of psorosis which causes a scaling of the bark [cf. **30**, p. 153] has not yet been seen, but concave gum psorosis [cf. **30**, p. 34], inducing gnarling and twisting of the trunk and limbs, was found on Surprise navel orange trees in Tauranga. Shell bark virus is widespread in New Zealand lemon orchards.

Grant (T. J.), Moreira (S.), & Costa (A. S.). **Observations on abnormal Citrus rootstock reactions in Brazil.**—*Plant Dis. Reptr*, **41**, 9, pp. 743–747, 1957.

The cause of bud-union symptoms of pegs and an orange-yellow ring on Florida rough lemon and trifoliate orange [*Poncirus trifoliata*] rootstocks with Pera sweet orange tops at Triete, Brazil, is unknown. Citrus xyloporosis virus [**36**, p. 526] does not appear to be involved since no symptoms were found on trees of the same tops on rootstocks of the xyloporosis-susceptible Lima da Persia sweet lime. Similar but more severe bud-union symptoms of indentation into the wood and cracking of the bark affecting Eureka lemon on trifoliate orange were evidently different in origin, as Eureka on Florida rough lemon was not affected; they were practically identical with those described by Weathers *et al.* from California [**35**, p. 446].

Klotz (L. J.) & DeWolfe (T. A.). **Possible solution for a basic disease problem.**—*Calif. Citrogr.*, **43**, 3, pp. 80, 85, 1958.

Comparison of the performance of Valencia orange on 8 different rootstocks showed that only on trifoliate [*Poncirus trifoliata*] selections was resistance to both tristeza virus and brown rot gummosis (*Phytophthora* spp.) [**37**, p. 235] achieved. These stocks are susceptible to exocortis virus so that clean budwood is essential; it is recommended that budwood be taken from healthy stocks established for 10 or more years on trifoliate.

Weathers (L. G.). **Newly found Citrus disease.**—*Calif. Citrogr.*, **43**, 4, pp. 138, 140, 3 fig., 1958.

This information on the virus disease causing vein yellowing of Eustis limequat trees has been noticed [**37**, p. 234].

Andrade (A. C.), Puzzi (D.), & Torres (S. C. A.). **Experiências para o contrôle de podridões que ocorrem em limões durante o transporte.** [Experiments on the

control of rots occurring in Lemons during transport.]—*Biológico*, **22**, 6, pp. 99–103, 3 graphs, 1956. [Received 1957.]

In experiments at the Instituto Biológico, São Paulo, Brazil, immersion of Sicilian lemons for 2 min. in a solution of the sodium salt of 2,4-D at 200 p.p.m. was effective against rots occurring during transport [cf. **28**, p. 393]. There are indications that the butyl ester of 2,4,5-T is more active than 2,4-D. The buttons are often infected by the same fungi which attack the peduncle; growth regulators, retarding the development of the abscission layer, prolong the life of the button and check fungal invasion. Increasingly satisfactory results have also been obtained with shirlan, alone and in combination with hormones.

Do Amaral (S. F.). **Providências para a erradicação do 'cancro cítrico'.** [Provisions for the eradication of Citrus canker.]—*Biológico*, **23**, 6, pp. 112–123, 1 col. pl., 4 fig., 1 map, 1957.

Full particulars are given of the measures already taken and those planned in connexion with the discovery of *Xanthomonas citri* on lime and orange in the region of Presidente Prudente, São Paulo, Brazil. In addition to a ban on the sale of nursery plants, bud wood, and fruits from the affected region, various forms of propaganda have been put out, and provisions made for a secondary phase of the campaign, comprising destruction of diseased plantation trees and surrounding healthy ones within a 12-m. radius, 6-monthly inspections to determine whether these steps are efficient and observe the condition of the remaining trees, and destruction of all diseased trees on estates in towns situated within the banned zone, followed by periodical inspections. Already 137,075 plants in 9 nurseries have been destroyed and the disease has been eradicated from 64 of 159 infected groves, entailing the destruction of 7,417 trees.

Bitancourt (A. A.) **O cancro cítrico.** [Citrus canker.]—*Biológico*, **23**, 6, pp. 101–111, 1 map, 1957.

This is a useful survey of up-to-date information on citrus canker (*Pseudomonas* [*Xanthomonas*] *citri*), with special reference to its recent detection in Brazil [see above].

Mancha aureolada, nova moléstia bacteriana do cafeeiro. [Halo spot, a new bacterial disease of the Coffee bush.]—*Biológico*, **22**, 6, pp. 93–98, 3 fig., 1956. [Received 1957.]

A popular account of the disease caused by *Pseudomonas* sp., already noticed [**36**, p. 643], and its distribution in Brazil.

Bitancourt (A. A.). **O tratamento das cerejas de Café para melhorar a bebida.** [Treatment of Coffee berries to improve the flavour.]—*Biológico*, **23**, 1, pp. 1–11, 1 fig., 1957.

Following a series of tests from 1939–43 in São Paulo the author concludes that although spraying maturing coffee berries with Bordeaux mixture checks [unspecified] rots [cf. **36**, p. 760] responsible for poor flavour in years when the weather favours fermentation and rotting, the cost is not economic.

Flor (H. H.). **Genic systems in Flax and the Flax rust fungus.**—*Robigo*, *1957*, 4, pp. 2–3, 1957. [Spanish translation.]

Most of this information from the Agricultural Experiment Station, Fargo, N. Dakota, on the inheritance of the host-parasite interaction of flax and the rust fungus [*Melampsora lini*: **36**, p. 186] has been noticed [**35**, pp. 526, 892]. On flax varieties with 1, 2, 3, or 4 genes for resistance to an avirulent race of the fungus ratios of avirulent to virulent cultures were 3:1, 15:1, 63:1, and 255:1, respectively.

Each of the 25 major genes conditioning rust reaction has been isolated in a single flax line; these genes occur at 5 loci, 3 of which are independently inherited, and the other 2 are linked.

Asthana (R. P.). **Incidence of wilt disease (on Linum usitatissimum in M.P.).**—*Nagpur agric. Coll. Mag.*, **31**, 1–4, pp. 16–17, 1956–7. [Received Nov. 1957.]

Wilted linseed plants from fields in Uttar Pradesh and Madhya Pradesh contained either *Fusarium* sp. [**35**, p. 367] or *Rhizoctonia* sp. Seed-inoculation experiments over 7 years showed that the *Fusarium* sp. alone caused 76·08% wilting, *Rhizoctonia* sp. alone 10·4%, and a half and half mixture of both 50·83%. The average wilting of 13 varieties tested in the field ranged from 3·32 to 7·43%; ST6 proved the most resistant, No. 1193 the least. Treating seed with mercury compounds, particularly ceresan, reduced wilting, which is most severe in a late sown crop.

Milatović (Ivanka). **Phoma sp. na Lanu.** [*Phoma* sp. on Flax.]—*Zasht. Bilja* (*Plant Prot., Beograd*), *1956*, 38, pp. 51–56, 1 fig., 1956. [English summary. Received 1958.]

In the Petrinja region of Croatia in 1954 Concurrent flax plants affected by a wilt and root rot (*Fusarium* sp.) bore pycnidia of *Phoma* sp. on the lower part of the stems. Experiments in the greenhouse indicated that the *Phoma* isolate was not the primary cause of foot rot. The fungus is similar to the one described by Kerr [**32**, p. 625]. Spore measurements in culture were 5·2–7·8 × 2·6–3·9 μ.

Porzhenko (V. V.). Новие протравители в борьбе с загниванием семян и гибелью всходов Хлопчатника на Украине. [New materials for the control of seed rotting and seedling loss of Flax in Ukraine.]—Тр. Укр. н.-и. ин-та Хлопк. Защ. раст.—Киев. [*Trud. ukr. nauk-issled. Flax Inst., Zashch. Rast. Kiev.*], *1956*, pp. 32–45, 1956. [Received 1958. Abs. from *Referat. Zh. Biol.*, *1957*, 20, p. 180, 1957.]

The causes of and conditions for the rotting of flax seeds and seedlings in fields in the S. Ukraine are described. The following fungi are listed as the causal agents: *Rhizoctonia* [*Moniliopsis*] *aderholdi*, *Fusarium javanicum*, *R.* [*Corticium*] *solani*, and *Rhizopus nigricans* [*R. stolonifer*]. Granosan dust at 10 kg./ton seed proved very effective in control; formalin had no effect.

Kováts (Z.). **Virágzásfenológiai megfigyelések a kerti Oroszlánszáj (Antirrhinum majus L.) változatain, különös tekintettel a rozsdakártétel hatásának vizsgálatára.** [Phenological observations of flowering of garden varieties of Snapdragon (*Antirrhinum majus* L.) infected by rust.]—*Kertész. Szőlész.* (*Ann. Acad. Horti- et Viticult., Hung.*), **18** (**2**)*1954*, 3, pp, 41–53, 6 col. pl., 4 graphs, 1956. [Russian and English summaries. Received 1957.]

At the Horticultural Research Institute, Hungary, in 1953–4, it was established that the killing or weakening of garden varieties of antirrhinum infected by *Puccinia antirrhini* [**35**, p. 456 and below], according to the degree of rusting, was a drought effect. The disease is especially prevalent in countries with a continental climate. There was a connexion between the intensity of flowering and rust susceptibility.

Leheoczky (J.). **Az Oroszlánszáj rozsdabetegségéről.** [The rust disease of Snapdragon.]—*Kertész. Szőlész.* (*Ann. Acad. Horti- et Viticult., Hung.*), **18** (**2**)*1954*, 3, pp. 3–39, 13 fig., 1 graph, 1956. [Russian and German summaries.]

Puccinia antirrhini [see above] often becomes epiphytotic in Hungary under the prevailing arid conditions. The uredospores overwinter in the soil. Inoculation on 20 Apr. and 3 May 1954 with uredospores collected from depths of 3·5 and 11·5

cm. in river sand induced infection, whereas those from frozen stems tested on 13 Jan. were no longer viable. The opt. temp. for uredospore germination was 10° C. and for mycelial development 20°–25°. S-containing products, notably zineb and ferbam, have proved superior for control to those based on Cu.

Rangone Gallucci (Maria M.). **Nota preliminare su una nuova malattia dell' Asplenium nidus L.** [A preliminary note on a new disease of *Asplenium nidus* L.]—*Boll. Lab. sper. Fitopat., Torino*, N.S., **19** (*1956*), 2, pp. 115–120, 1 pl., 1957.

In Aug. 1956 *Asplenium nidus* plants received in an apparently healthy condition from Holland and grown in a glasshouse at Pallanza, Italy, developed a serious ring spot which affected every plant in the house. Others received subsequently from the same source and kept in a different greenhouse all remained healthy. The condition became arrested towards the end of Sept. simultaneously with growth renewal. No fungus or bacterium appeared to be associated with the ring spot, which was transmitted from affected to healthy *A. nidus* plants by sap inoculations. The condition was considered probably due to a virus.

Brierley (P.) & Smith (F. F.). **Carnation viruses in the United States.**—*Phytopathology*, **47**, 12, pp. 714–721, 7 fig., 1957. [32 refs.]

After a review of previous literature and the elucidation of certain conflicting results reported in the past, the results of observations made at Beltsville, Maryland, are presented. Use of the term 'carnation yellows virus' [**36**, p. 647] for double infections by carnation mosaic virus and streak [? str. of aster yellows virus] is considered misleading as the symptoms do not suggest a yellows disease and are only additive. Carnation streak virus [loc. cit.] may be confused with feeding injury due to *Myzus polaris*; it was transmitted by grafting from carnation to carnation, but not by *Macrosteles fascifrons*. Western aster yellows virus [str. of aster yellows virus] proved transmissible from *Vinca rosea* to Donna Lee carnation only by dodder (*Cuscuta campestris*), causing initial curvature of the leaf tips, but it did not persist in the plant or produce streak.

Carnation mosaic virus [loc. cit] is separable from mixtures with carnation mottle and ring spot viruses by transmission by *Myzus persicae* to *Dianthus barbatus*. Details are given concerning its symptoms on various *D.* spp. and other hosts, and of the properties of 2 isolates of the virus. Carnation mottle virus infects *Chenopodium amaranticolor* [**37**, p. 220] at high dilutions (1 : 5 million), this being a better indicator host than *D. barbatus*. Carnation ring spot virus [**35**, p. 100], believed to be relatively rare in the United States, has no known vector, but was detectable in *Gomphrena globosa* 4–5 days after sap inoculation; it infected many other plant species. The physical properties of the virus and the symptoms on carnation and other hosts are described.

The percentage prevalence of these viruses in 151 carnation varieties from 8 States was streak, 11; mosaic, 3; mottle, 92; and ring spot, 1. Only mottle proved transmissible by root contact, and only this virus and ring spot by the cutting knife.

Moreau (Mireille). **À la recherche d'un moyen de lutte contre les parasites vasculaires.** [In search of a control for vascular parasites.]—*Phytiatrie-Phytopharm.*, **5**, 4, pp. 229–238, 1956. [Received 1957.]

This information on the control of carnation wilt has already been noticed [**36**, p. 762].

Ross (J. P.). **Studies on the chemotherapy and physiology of the Verticillium diseases of Peppermint and Chrysanthemum.**—*Diss. Abstr.*, **17**, 1, p. 11, 1957.

At Cornell University cuttings of healthy chrysanthemum and peppermint and

other cuttings, previously inoculated with *V. albo-atrum* [**35**, p. 844; **36**, p. 646; **37**, p. 104] by allowing them to take up spores from a suspension, were tested with 27 chemotherapeutants absorbed through the freshly-cut basal ends. Fungichromin and nabam proved most effective, but neither was as good as desired. The pathogen was eradicated from some peppermint cuttings by these materials, but it was never eradicated from chrysanthemum. Lack of chemotherapeutic control was believed to be due to accumulation of the toxicant in the leaves and not at the site of the fungus in the stem, the fungistatic and not fungicidal nature of nabam, the upward movement and development of the spores of the fungus in the vessels of the cutting, and the variability in uptake of the toxicant by the vessels.

Large increases in the total amino-acid N were detected in the treated cuttings. Fungichromin at 10 p.p.m. caused the release into the culture medium of all the soluble amino-acids of *V. albo-atrum*; at 2 p.p.m. a change in the relative composition of the free amino-acid pool was noticed. Infected plants 40 days after inoculation differed markedly from healthy plants in amino-acid composition, the most important change being an increase in proline. The amino-N of the stems of infected peppermint plants increased 3–6 times above that of healthy and pipecolic acid was detected in infected but not healthy peppermint plants. Studies on its origin suggest that it may be from lysine supplied by the pathogen within the vascular system.

McFadden (L. A.). **Studies on the chemotherapy of bacterial blight of Chrysanthemum, caused by Erwinia chrysanthemi.**—*Diss. Abstr.*, **17**, 1, pp. 10–11, 1957.

At Cornell University over 24 materials were used as systemic chemotherapeutants for the control of *E. chrysanthemi* [**35**, p. 189] on chrysanthemum. Chloromycetin, streptomycin [**35**, p. 456], aureomycin, terramycin, penicillin G, and tetracycline almost completely inhibited the disease when cuttings were placed in antibiotic solutions for 4 hr. and then set in a rooting medium in the greenhouse. If the cuttings were kept in a moist chamber at 80° F. for 48 hr. after treatment a much higher concentration of the antibiotics was necessary.

Pesante (A.). **La ruggine della Statice sinuata L. (Uromyces savulescui Rayss) in Italia.** [The rust of *Statice sinuata* L. (*Uromyces savulescui* Rayss) in Italy.]—*Boll. Lab. sper. Fitopat., Torino*, N.S., **19** (*1956*), 2, pp. 93–114, 4 pl., 5 fig., 1957. [English summary.]

Further studies on the rust of *Statice sinuata* [*Limonium sinuatum*], recently reported from Italy [**33**, p. 29] and now ascertained to be due to *U. savulescui* and its symbionts *Tuberculina sorozzii* and *Darluca filum*, are presented and the symptoms of the disease and the biological characters of the causal organism and its symbionts described.

Current research and investigation.—*Orchard. N.Z.*, **30**, 10, p. 13, 1957.

Further tests in New Zealand of apple stocks for resistance to collar rot (*Phytophthora cactorum*) [**36**, p. 47] showed that M. XIII, Merton 778 and 789, and MM. 113 are highly susceptible.

In the spring of 1956 there were serious losses of peach trees growing near Auckland; *P. cinammomi* was isolated from many dying trees and from soil below the dead ones.

Harvey (H. L.). **Apple mosaic—a virus disease.**—*J. Dep. Agric. W. Aust.*, Ser. 3, **6**, 4, pp. 427–429, 1 fig., 1957.

During the 1956–7 season, apple mosaic [cf. **28**, p. 512; **35**, p. 422; **36**, p. 576] was more conspicuous than usual in Western Australia, where it has been present for many years. Affected leaves tend to scorch and fall prematurely, and during the season in question this resulted in a high percentage of sunburnt fruit, owing to inadequate foliage protection during the summer heat.

Blumer (S.) & Bovey (R.). **Über den virösen Besenwuchs an Apfelbäumen (proliferation virus).** [On the virus broom growth on Apple trees (proliferation virus).]—*Phytopath. Z.*, **30**, 3, pp. 237–258, 5 fig., 1 graph, 1957. [French and English summaries. 18 refs.]

A tabulated account is given of an investigation of a severe outbreak of proliferation disease on 1-yr.-old Schneider apple grafts in the canton of Vaud, Switzerland [**35**, p. 107], with a description of the symptoms. Since a few branches of the trees used as sources of budwood bore witches' brooms, the proliferation of young trees is assumed to be identical with the latter virosis on old ones [cf. **35**, p. 374; **36**, p. 533].

Storey (I. F.). **Recent experiences in the control of Apple scab.**—*Agriculture, Lond.*, **64**, 9, pp. 454–458, 1 fig., 1957.

The author reports his conclusions from a survey of apple scab (*Venturia inaequalis*) control in the Wisbech–King's Lynn district from 1952–7 [**36**, p. 35], carried out under the auspices of the National Agricultural Advisory Service, East Midland Region. This area had hitherto been noted for serious damage to the widely grown Bramley's seedling, in spite of careful spraying, but the period in question was marked by a considerable improvement in control, attributed largely to the virtually complete displacement of preventive sulphur sprays by curative mercurials. Application 4 days after infection proved best and low volume spraying was effective. Hirst's modification of the 'dew balance' [**36**, p. 704] gave reliable indication of infection periods and very good results were obtained when warning of these periods was given. Experimental spraying with DNOC [cf. **36**, p. 652] effectively killed the fungus in overwintering leaves provided that a sufficient volume of liquid was used.

Darpoux (H.) & Arnoux (M.). **Étude de l'efficacité de divers produits contre les tavelures du Poirier et du Pommier.** [Study of the effectiveness of various products against scab of Pear and Apple.]—*Phytiatrie-Phytopharm.*, **6**, 1, pp. 3–7, 1 graph, 1957.

In apple and pear orchards at the Station Centrale de Pathologie Végétale, Versailles, the discharge of ascospores of *Venturia inaequalis* and *V. pirina* was recorded [**35**, p. 108], and a number of products, applied before and after the periods of maximum discharge, were assessed for their preventive and curative action. Products containing copper oxyquinolinate, thiocyanodinitrobenzene, and dichlone displayed preventive activity on both apple and pear, as did also a 2-heptadecyl glyoxalidine acetate and a mixture of thiram, ziram, and arsine on apple. Copper oxyquinolinate appeared to exert a curative action also [see below].

Darpoux (H.) & Arnoux (M.). **Essais de produits à action curative contre les tavelures du Poirier et du Pommier.** [Trials of curative products against scab of Pear and Apple.]—*Phytiatrie-Phytopharm.*, **6**, 1, pp. 9–13, 1957.

A product containing 12% copper oxyquinolinate depressed by at least 50% the number of lesions on the leaves of young potted pear trees (var. Beurré d'Hardenpont) inoculated 5 days previously with conidia of *Venturia pirina*. PMA was equally effective but caused some scorching. Glycerol did not affect the activity of these or other products tested.

In similar experiments with apple (var. Paradis EM III) 6 products (containing actidione, trichothecin, 50% dichlone, double sulphate of oxyquinoline, copper oxyquinolinate, and phenyl mercury triethanol ammonium lactate) significantly reduced the number of lesions produced by *V. inaequalis*, but there was too little infection in the controls to compare their effectiveness properly.

Hey (G. L.). **Bitter pit causes losses on the tree.**—*Grower*, **48**, 14, pp. 677–678, 3 fig., 1957.

Writing from the Murphy Chemical Co., Wheathampstead, Herts, the author states that during 1957, because of the very dry spring, there was very little apple and pear scab [*Venturia inaequalis* and *V. pirina*, respectively] before blossoming, and even after that infection was very light. Apple mildew [*Podosphaera leucotricha*] was prevalent in many orchards because of the previous mild winter, the spring drought, and the dry June and July. Spraying is not sufficient to give control. Cutting out the diseased flower trusses at pink bud before secondary infection occurs is essential; infected shoots can be removed then or earlier [see below].

Physalospora obtusa was isolated from a number of samples of Worcester Pearmain apples. Bitter pit [cf. **32**, p. 133] was very serious in fruit still on the tree, even with varieties which are not usually affected, such as Worcester. *Gloeosporium* spp. [**37**, p. 88] were found on James Grieve and Worcester apples still on the tree.

Hey (G. L.). **Apple mildew—1. Is infection greater after a mild winter? 2. Mid-May to mid-July is the vital time.**—*Grower*, **47**, 13, pp. 800–802, 5 fig.; 14, pp. 865, 867, 869, 1 fig., 1957.

Apple mildew (*Podosphaera leucotricha*) [**36**, p. 596] has become very serious in eastern England, for a number of reasons, including the use of low volume as opposed to high volume spraying, organic sprays instead of sulphur, also a series of dry springs, and changes in pruning methods. Commonly affected varieties are Cox, Jonathan, Lane's Prince Albert, and Lord Derby, and to a much lesser extent Bramley's Seedling. A count of percentage mildew-infected spurs at pink-bud is the best way to evaluate infection, that which occurs early in the season resulting from the previous year's weather conditions and spray programme. Only 2 fungicides have been found effective, sulphur (a table of formulations is given) and karathane. Application of sulphur in the pink bud stage is a wise precaution, as the mildew may occur early in May. There is evidence that for normal, high volume, commercial use $2\frac{1}{2}$ lb. 80% wettable sulphur/100 gal. is adequate and when this rate is used for mildew control, captan, mercury, or thiram must be added for scab control. Karathane, used at 1 lb. wettable powder (25% active material)/100 gal., is not so persistent as sulphur, remaining active only for 7 days instead of 14, but it appears to eradicate the mycelium as well as the spores. The most important period for sprays is the time of development of next year's fruit buds. It is advisable to use karathane at pink bud stage in orchards where heavy mildew infection has occurred, but in normal conditions the first application can be delayed until full bloom. Evidence proved that low volume spraying is adequate only in orchards where infection is at a low level. A number of possible spray programmes are detailed to suit different apple varieties, also one for pears.

Fulkerson (J. F.). **Botryosphaeria ribis and its relation to a rot of Apple.**—*Diss. Abstr.*, **17**, 3, p. 475, 1957.

At N. Carolina State College monoconidial cultures of 277 isolates of *B. ribis* [cf. **37**, p. 164] from 17 different hosts and 11 localities showed considerable uniformity, except when obtained from unrelated parental types. Isolates from blueberry in N. Carolina and a number of woody hosts in California produced yellow pigment in culture [**32**, p. 670], as did 2 atypical isolates from apple in N. Carolina. All others varied from light grey to dark olivaceous, with appressed mycelial growth. Those from blueberry and redbud [*Cercis* sp.] were the most vigorous.

Conidia were produced only in the light. Those of the redbud and blueberry isolates were 15·6–17·3 × 5·9–7·2 μ, while all others were 20·9–24·7 × 5·9–7·2 μ. Microconidia were rarely produced.

All isolates but 1 were pathogenic to apple [cf. **36**, p. 104]. At 65–75° F. the rot usually developed rapidly, being characteristically soft and clear tan or pink. At unfavourable temperatures or where the rot was slower the affected tissues were firm and brown or dark tan. Five isolates from apple, 2 from pear, and 2 others (from California) were pathogenic to blueberry and/or redbud. A purple pigment occurred in some cultures on alkaline starch media exposed to continuous fluorescent light at 300 ft.c. for 6–12 days.

Krapf (B.). **Grünflecken, 'green blotch', auf Äpfeln.** [Green blotch on Apples.]—*Schweiz. Z. Obst- u. Weinb.*, **66**, 25, pp. 594–600, 6 fig., 1957.

From the Eidgenössische Versuchsanstalt, Wädenswil, the author describes in some detail the histology of the green blotches which develop on the skin of apples (var. Glockenapfel) following frost damage. This condition has also been recorded in England [**27**, p. 246].

Blumer (S.). **Das Birnenmosaik.** [Pear mosaic.]—*Schweiz. Z. Obst- u. Weinb.*, **66**, 20, pp. 459–463, 3 fig., 1957.

The author reports from the Eidgenössische Versuchsanstalt, Wädenswil, the finding at Isikon, Zürich Oberland, in 1953, of typical pear mosaic [virus] symptoms [cf. **35**, p. 831; **36**, p. 330] on a Neue Poiteau scion but not on scions of Josephine von Mecheln and Böriker on the same [unspecified] stock. Subsequently all three were grafted to Juli Dechant on a Fischbächler seedling stock, and the symptoms on all 5 varieties are recorded.

Grafting to Gellerts Butterbirne produced clear and typical symptoms, as on Neue Poiteau and Fischbächler. Symptoms were ill-defined on Juli Dechant and even more so on Josephine von Mecheln. Neue Poiteau, though not very widespread in Switzerland, is almost always infected.

Scaramuzzi (G.). **Una virosi con deformazione, maculatura verde e suberosi interna dei frutti di Cotogno (Cydonia oblonga Mill.).** [A virosis with deformation, green spotting, and internal cork of the fruit of Quince (*Cydonia oblonga* Mill.).]—*Phytopath. Z.*, **30**, 3, pp. 259–274, 7 fig., 1957. [English and German summaries. 38 refs.]

The most conspicuous symptoms of a disease of Piriforme quince fruits observed at a horticultural institute near Florence in the summer of 1953 were pronounced malformation with swellings and depressions, more or less densely aggregated, slightly sunken, darker green spots, 2–4 mm. diam. on the skin, and internal cork in the flesh. Boron deficiency was at first suspected, but no improvement resulted from applications of this element. The absence of pathogenic organisms suggested the implication of a virus, and this hypothesis was confirmed by successful transmission experiments in which diseased material was bud-grafted on healthy Zulcherino di Persia and Gigante de Leskovatz trees. Some leaves of the latter variety also developed mild mosaic.

The paper concludes with a discussion of some analogies between the quince virus and certain apple and pear viroses [cf. **36**, p. 330], boron deficiency in the 2 last-named, and a virus infection of quince in Bulgaria [**14**, p. 640].

Verona (O.) & Bertini (S.). **Un notevole attacco di ruggine su Cotogno probabilmente dovuto a Gymnosporangium clavariaeforme (Jacq.) DC.** [A noteworthy attack of rust on Quince, probably due to *Gymnosporangium clavariaeforme* (Jacq.) DC.]—*Ann. Sper. agr.*, N.S., **11**, 6, *Suppl.*, pp. lxxiii–lxxvi, 2 pl., 1 graph, 1957. [English summary.]

In June 1956 quince trees growing near Pontedera, Pisa, Italy became severely infected by a rust affecting mainly the branches and axes of the germinating buds,

which was identified from the aecidia as *Gymnosporangium clavariiforme* [cf. **36**, p. 279]. Five varieties of pear growing in the same orchard were unaffected [cf. **17**, p. 535], as were juniper trees (*Juniperus*) in the vicinity.

Blumer (S.). **Beobachtungen über die Weidenblättrigkeit der Fellenbergzwetschge (Prune Dwarf).** [Observations on 'willow leaf' of Fellenberg Prune Plums (Prune dwarf).]—*Schweiz. Z. Obst- u. Weinb.*, **66**, 23, pp. 531–537, 4 fig., 1957.

From the Eidgenössische Versuchsanstalt, Wädenswil, it is reported that of 17 Fellenberg (= Italian Prune) scions grafted to Schöne von Löwen on various stocks all developed typical 'willow leaf' symptoms of prune dwarf [virus] infection [cf. **35**, p. 106], while those of Fertilita and Florentia developed leaf stunting on some branches and an ill-defined mosaic. Examination of the tree of Schöne von Löwen which had provided the intermediate grafts revealed a slight diffuse mosaic. From this and from a further experiment in which scions of Bühler, Ebersweier Early and Ruth Gerstetter prune plums were grafted to an infected tree of the Fellenberg variety, it was concluded that only in Ebersweier Early did the infection express itself, as in Fellenberg, by deformation of the leaves, while in the others it expressed itself by mosaic patterns (clearest in Zimmer's Early prune plum, Gelbe Eierpflaume, and Grosse Grüne greengage, being difficult to distinguish from line pattern), or was latent (Bühler). It is concluded that in nurseries all trees showing mosaic or line pattern should be eliminated.

Crosse (J. E.) & Hingorani (M. K.). **A method for isolating Pseudomonas mors-prunorum phages from the soil.**—*Nature, Lond.*, **181**, 4601, pp. 60–61, 1 fig., 1958.

At East Malling Research Station the soil beneath diseased cherry, plum, and apricot trees was found to be a prolific source of phages for *P. mors-prunorum* [**37**, p. 94]. These were isolated by placing 150 g. soil samples in sterile glass jars, enriching with a 48-hr. culture of the organism in nutrient broth plus 2% glycerine, shaking the mixture periodically for 48 hr., and then decanting the supernatant, which was partially clarified by ordinary filtration and then centrifuged. The liquid was then treated with chloroform to kill bacteria, and sampled for plaque formation by the poured-plate method, using NA3 as the propagating strain.

Plaques, varying in number with the different soil samples from a few to several hundred per plate, were observed after 24 or 48 hr. The phages were purified by picking out individual plaques from streak cultures and repropagating in broth cultures of NA3, the process being repeated 2–3 times, and the phages finally brought to high titre by serial transmission in broth cultures. The isolates fell into 3 groups: large (2 mm.) and circular with a 'halo', medium-sized (1 mm.) and irregular, and punctiform (0·5 mm.).

Jensen (D. D.). **Transmission of Peach yellow leaf roll virus by Fieberiella florii (Stål) and a new vector, Osbornellus borealis De L. & M.**—*J. econ. Ent.*, **50**, 5, pp. 668–672, 1957.

The results of field studies in 1955–6 demonstrated the great potential importance of the leafhopper *F. florii* as a carrier of peach yellow leaf roll [str. of peach western X disease] virus in a major canning peach district of California. Though seldom encountered in the field, *F. florii* was present in relatively large numbers in an extensive peach orchard during the 2 years of observation, but did not occur in any of the other orchards sampled in the region. In the former area the number of diseased trees increased from 7 in 1954 to 202 in 1956, while elsewhere the spread of the virosis was inconsiderable.

In greenhouse tests the leafhopper transmitted the virus from peach to 40 of 41 Golden Self Blanching celery [**36**, p. 106] and to 8 of 30 Lovell peach trees.

O. borealis, not previously recorded as a vector of any plant virus, conveyed this virus from peach to 7 of 9 celery plants and to 1 of 4 peach trees. This insect was collected in the early nymphal stage, together with *F. florii*, on myrtle and privet.

Scaramuzzi (G.). **La 'maculatura chlorotica' del Pesco, malattia da virus riscontrata anche in Italia.** [Peach blotch, a virus disease found also in Italy.] — *Ann. Sper. agr.*, N.S., **11**, 5, *Suppl.*, pp. lxxvii–lxxxvi, 1 col. pl., 2 fig., 1957. [English summary.]

In May 1955, two 3-year-old Morettini 14 peach trees growing in a garden at Pavia were affected by a disease identified from the symptoms and manner of progress as due to peach blotch virus [**25**, p. 458]. The condition was transmitted by grafting to Elberta peaches. In June 1954 the author had observed the same disease in Yugoslavia.

Grosclaude (C.). **Lutte contre la cloque du Pêcher.** [The control of Peach leaf curl.]—*Phytiatrie-Phytopharm.*, **6**, 3, pp. 165–169, 1957.

In spraying tests against peach leaf curl (*Taphrina deformans*) [cf. **36**, p. 106] conducted in 2 orchards in S.W. France in the winter of 1956–7, captan at 0·5% and ziram at 0·25% gave as good control as 2% Bordeaux mixture. Zineb at 0·3% was not satisfactory. In one orchard spraying was carried out on 19 Feb. 1957, and was followed by heavy rains; one-half of the trees were therefore sprayed again on 25 Feb. with Bordeaux at 1·5%. In the other orchard Bordeaux (2%) was applied to a few trees only of each variety on 21 Nov. 1956; the remaining trees, except the untreated, were sprayed on 18 Feb. only. In wet seasons the spray given at bud-swell should be followed by a further application, provided the latter is given before the leaves have opened too much. An application of Bordeaux in autumn also provides a useful degree of protection against *T. deformans*.

Melik-Khachatryan (J. C.). Материалы по изучению дырчатой пятнистости Косточковых Плодовых пород Армянской ССР. [Materials from the study of shot-hole on stone fruit in Armenian S.S.R.]—Научн. тр. Ереванск. ун-т. [*Nauch. Trud. Erevan Univ.*], **54**, pp. 113–126, 1956. [Armenian summary. Abs. from *Referat. Zh. Biol., 1957*, 21, p. 166, 1957.]

Shot-hole (*Clasterosporium carpophilum*) on peaches is very widespread in the Ararat valley, Armenia. The spores overwinter in the soil at 5–10 cm. depth. At 5 cm. only conidia are formed, but at 10 cm. microsclerotia develop. Gevondi and Spitak Nakhichevani were the most susceptible peach varieties, Erevan the most resistant.

Morvan (M. G.). **Mise en évidence de l'action d'un virus dans le dépérissement de l'Abricotier.** [Demonstration of the action of a virus in wilt of Apricot.]—*C.R. Acad. Agric. Fr.*, **43**, 11, pp. 613–614, 1957.

At the Institut National de la Recherche Agronomique, Saint-Genis-Laval (Rhône), buds from apricot trees exhibiting 'growth irregularity', a form of wilt [**36**, p. 37], were grafted in June to healthy plum and peach stocks. In the following winter some plum stocks showed a tendency to resume growth, and after 15 months they showed clear symptoms of leaf roll with interveinal yellows. All shoots with these symptoms recommenced growth during the following Dec. and developed phloem necrosis following the winter frosts. These symptoms appeared on the shoots from affected apricot bud grafts and likewise on shoots from healthy grafts on the same stock. In a repetition of the experiment the condition was transmitted from affected to healthy grafts via the plum stock in 44 of 89 cases; transmission always occurred where the affected bud graft took successfully and itself developed the symptoms. On peach stocks the leaf symptoms often appeared in the summer immediately following grafting. Some stocks rapidly developed leaf roll in the 2nd summer and

died, while others came into growth in the second winter. It is concluded that 'growth irregularity' of apricot is a virus disease.

Ciccarone (A.). **Brevi note su alcune chlorosi del Mandorlo.** [Brief notes on some chloroses of Almond.]—*Tecn. agric.*, **9**, 2, pp. 67–77, 5 fig., 1957.

An account is given of the symptoms and control of iron deficiency of almond trees growing near Syracuse, Sicily. The paper concludes with a brief note on the treatment of other deficiencies of metallic ions in fruit trees.

Milbrath (J. A.). **Midleaf necrosis—a virus disease of Sour Cherry.**—*Phytopathology*, **47**, 11, pp. 637–640, 3 fig., 1957.

In the course of attempts at Oregon State College, Corvallis, to separate cherry (sour) yellows virus from peach ring spot virus by the slower movement of the latter in Shiro-fugen flowering cherry (*Prunus serrulata*) [**24**, p. 236 *et passim*] a hitherto unrecognized virus was obtained which caused large spreading necrotic areas on the leaves of Montmorency sour cherry, often limited to the neighbourhood of the main veins. Affected leaves became chlorotic and either fell or withered rapidly. Infected trees were smaller than healthy, but fruit was normal. An Olivet sour cherry and a Bing sweet cherry were found carrying the virus (which is named cherry midleaf necrosis) without symptoms, and it was also seen in commercial cherry orchards. It appears to be unrelated to the peach ringspot and cherry (sour) yellows viruses.

Milbrath (J. A.). **Effect of some Sour Cherry viruses on growth of young orchard trees.**—*Phytopathology*, **47**, 11, pp. 655–657, 1 fig., 1957.

At Oregon State College, Corvallis, 107 Montmorency sour cherry trees were inoculated when in the nursery with mild and severe strains of peach ring spot, cherry (sour) yellows, peach stunt [**37**, p. 91], prune dwarf, a sour cherry bark splitter (*Phytopathology*, **44**, p. 484, 1954), and sour cherry midleaf necrosis [see above] viruses in various combinations. They were set out 10 ft. apart the following spring, with uninoculated checks, and growth measurements made 4 years later. The results are tabulated. The presence of any of the viruses caused noteable reduction in growth [cf. **35**, p. 304], increasing with the severity of the strain and number of viruses present; infected trees varied in height from 4·2–8·8 ft. and in girth from 0·9 to 2·8 in. Some progeny of a Shiro-fugen flowering cherry used in the separation of cherry midleaf necrosis showed reduced growth but no foliage symptoms, indicating the presence either of a very mild strain of midleaf necrosis virus, or of an unidentified latent virus. Cherry midleaf necrosis virus had the greatest effect.

Fulton (R. W.). **Properties of certain mechanically transmitted viruses of Prunus.**—*Phytopathology*, **47**, 11, pp. 683–687, 1957.

The results are given of further studies at the University of Wisconsin, Madison, of viruses A, B, E, and G obtained from sour cherry [**37**, p. 91]. A, E, and G were most infective at pH 8, B at pH 8·7, and all were more infective in 0·1 M buffer than 0·01 or 0·03 M. E and G in 1:25 dilution in buffer were thermally inactivated in 10 min. at 56° C., A at 54°, and B at 44°; at 24° A remained infective for 6 hr., G for 9, and B and E for 15. Rinsing leaves with water after inoculation gave 10–30% fewer lesions than blotting them dry without rinsing. All lost nearly all infectivity in undiluted sap within 2 min.; at 1:80 A, E, and G lost more than half within 1 hr. at 24°, while B retained nearly half for 3 hr.; at 0° the first 3 lost half their infectivity in 3 hr., and B none. Reducing agents did not prolong the infectivity of any of them, B and E in extracts with 0·0001 M NaCN lost infectivity less rapidly than in buffer alone, and the infectivity of all was markedly decreased by salts with divalent metallic ions. B was more infectious in 0·03 M sodium oxalate

than in phosphate buffer, but the other 3 less so. Buffer extracts containing 0·01 M cysteine hydrochloride and 0·001 M NaCN or 0·01 M sodium oxalate stabilized the infectivity of B, but not the others. Virus B is considered to differ from the others, E may be distinct from A or G, which are very similar.

Herzmann (H.) & Baumann (Gisela). **Untersuchungen über den Spurenelementgehalt viruskranker Sauerkirschenbäume.** [Studies on the trace element content of virus-diseased Sour Cherry trees.]—*Phytopath. Z.*, **30**, 3, pp. 329–338, 5 graphs, 1957. [21 refs.]

Fortnightly analyses of the Fe, Mn, Cu, and Zn contents of sour cherry trees (Shade Morello on *Prunus mahaleb* stocks) from the eastern Harz mountains affected by Stecklenberg disease [? str. of peach ring spot: **35**, p. 779] at the Institut für Phytopathologie, Aschersleben, Germany, during the growing period of 1956 revealed marked fluctuations in the youngest leaves, with 3 peaks—at the beginning, middle, and end of the season. The Fe and Mn contents of infected trees were appreciably lower than those of healthy ones.

Domes (R.). **Blattschäden an Fragaria vesca L. durch Phyllocoptes spez.** [Leaf injuries to *Fragaria vesca* by *Phyllocoptes* sp.]—*Z. angew. Ent.*, **40**, 4, pp. 522–527, 4 fig., 1957. [English summary.]

From the Biologische Bundesanstalt für Land- u. Forstwirtschaft, Institut für Obstbau, Heidelberg, is reported the occurrence in *Fragaria vesca*, attacked by the gall mite *Phyllocoptes*, of spotting (pale green and later necrotic), curling, and deformation of the leaves, recalling the symptoms of infection by viruses 1 [strawberry mottle virus: **35**, p. 904] and 3 [strawberry crinkle virus]. The plants in question were growing wild and were free from virus infection. The mite has not yet been found on cultivated strawberries.

Orchard (W. R.) & Van Adrichem (M. C. J.). **Relative resistance of some Strawberry species, varieties, and selections to powdery mildew at Saanichton, British Columbia.**—*Plant Dis. Reptr*, **41**, 11, pp. 945–947, 1957.

Powdery mildew (*Sphaerotheca humuli*), the most serious disease on strawberry in British Columbia, was tested on 7 spp., 32 vars., and 33 selections [cf. **34**, p. 531] and the results are tabulated. Three species proved resistant to mildew, selections of *Fragaria glauca* from N. British Columbia and Yukon being highly resistant compared with those from Vancouver Island, which were susceptible. There proved to be no clear cut line in inheritance of resistance or susceptibility. Of the spp., vars., and selections rated, 4 were uninfected and 16 can be considered as resistant; the remainder are susceptible.

Wilhelm (S.). **Rhizoctonia bud rot of Strawberry.**—*Plant Dis. Reptr*, **41**, 11, pp. 941–944, 1 fig., 1957.

From the University of California, Berkeley, the author reports a bud rot of strawberry caused by *R.* [*Corticium*] *solani* similar to that described by Demaree [**21**, p. 463] but differing from that described by Zeller [**11**, p. 661]. The disease, which kills the terminal buds in scattered small or large groups of plants in the winter and spring rainy seasons, has recently been serious on the coast of California. A number of other fungi usually found associated are noted. The disease may be spread in infected nursery plants.

Geard (I. D.). **Diseases of Strawberries.**—*Tasm. J. Agric.*, **28**, 4, pp. 383–388, 2 fig., 1957.

Notes are again presented on the principal diseases affecting strawberries in Tasmania [cf. **29**, p. 571]. Auchincruive Climax is particularly susceptible to the non-parasitic condition June yellows.

Arango B. (H.). **La sigatoka del Banano, Cercospora musae Zimm.** [Sigatoka disease of the Banana, *Cercospora musae* Zimm.]—*Acta agron. Palmira*, **6**, 4, pp. 159–172, 1956. [Received 1957.]

This is a general account of leaf spot disease of bananas [*Mycosphaerella musicola*] and its control. In Colombia [**35**, p. 906] ascospore infection is of minor importance in the epidemiology of the disease.

El-Helaly (A. F.), Ibrahim (I. A.), & Elarosi (H. M.). **Studies on Botryodiplodia fruit-rot on Banana in Egypt.**—*Alex. J. agric. Res.*, **3** (*1955*), 2, pp. 109–121, 1956. [Arabic summary. Received 1957.]

The pathogen causing black fruit rot of bananas in Egypt was identified at the Commonwealth Mycological Institute as *Diplodia musae*. The behaviour of the fungus in culture resembled that of *B. theobromae* [cf. **11**, p. 190], with which the authors consider *D. musae* to be synonymous. In inoculated Hindi banana fruits susceptibility was greatest at maturity, whereas in Magrabi the maximum rate of rotting was attained in premature fruits. The disease developed at 15°–35° C., rotting increasing greatly at 25°–35°.

Hafiz (A.), Ghafoor (A.), & Akbar (K.). **Record of Colletotrichum capsici on Malpighia in Pakistan.**—*F.A.O. Pl. Prot. Bull.*, **6**, 2, pp. 24–25, 1 fig., 1957.

C. capsici [cf. **36**, p. 616] was found on the leaves and petioles of Barbados cherry (*M. punicifolia*) at Dacca, E. Pakistan, in Nov. 1956.

Zentmyer (G. A.). **Report on Avocado diseases, cultures and seed collections in Chile—June 1956.**—*Agricultura téc., Santiago*, **16**, 1, pp. 43–46, 1956. [Received 1958.]

During a visit to Chile the author found root rot of avocado (*Phytophthora cinnamomi*) [map 302] in the La Cruz and San Vicente areas. *Verticillium* wilt (*V. albo-atrum*) was seen on young Hass trees in the Quillota area, and a few cases of what appeared to be *Dothiorella* canker (*Botryosphaeria ribis*), the latter pathogen also being isolated from the cankers on loquat (*Eriobotrya japonica*).

Boyce (A. M.). **Research and Avocado root rot.**—*Calif. Citrogr.*, **43**, 1, pp. 3, 18, 20–21, 1957.

The author states that *Phytophthora cinnamomi* [see above], the agent of avocado root rot, is very probably not native to California [**37**, p. 175]. Well over 100 other hosts are known. The Duke avocado rootstock possesses appreciable resistance and selections of this variety are undergoing study. Vapam is an effective soil eradicant for field use [**36**, p. 335]. Soil may also be treated by drying to a moisture content of below 1%. Lucerne meal retarded the progress of the disease in the greenhouse and in some field tests. When the soil is wet and well aerated zoospores are formed in abundance and the disease spreads rapidly. Most infection occurs at a pH in the range 4·5–7, in the warmer months, and when the soil is moist. Varying the N, P, and K levels has little effect on the fungus. At present a total of about 4,000 acres is affected in the major avocado-producing counties of S. California.

Zeinalova (Mme V.). Поражаемость Кормовых Злаков ржавчинными грибами Азербайджане. [Diseases of fodder grasses caused by rust fungi in Azerbaidzan.]—Соц. сельскохоз. Азербайджана [*Soc. agric. Azerbaidzan*], **3**, pp. 43–44, 1957. [Abs. *Referat Zh. Biol., 1957*, 21, p. 164, 1957.]

The following are severe on grasses locally: *Puccinia agropyrina* on quack grass [*Agropyron repens*], *P. coronifera* on fescue [*Festuca* sp.], rye grass [*Lolium perenne*],

and *A. repens*, *P. dactylidina* [**36**, p. 592] on all orchard grasses [*Dactylis* spp.], *P. imperatae* on *Imperata* sp., *P. graminis* on oats, *Dactylis* sp., *Festuca* sp., meadow grass (*Poa* spp.), *A. repens*, and *Bromus* sp., *Puccinia persistens* on rye grass, *P. poarum* on *Poa* spp., *Puccinia rubigo-vera* [*P. recondita*] on rye grass, and *P. poaesudeticae* and *Uromyces poae* on *Poa* spp.

Weihing (J. L.), Jensen (S. G.), & Hamilton (R. I.). **Helminthosporium sativum, a destructive pathogen of Bluegrass.**—*Phytopathology*, **47**, 12, pp. 744–746, 1957.

At the University of Nebraska, Lincoln, *H. sativum* [*Cochliobolus sativus*] was isolated from diseased *Poa pratensis* from eastern Nebraska, where considerable dying-out has occurred in recent years, and found to be highly pathogenic on inoculation to the same host, besides attacking barley, wheat, rye, and maize. At 100% R.H. and 20° C. the fungus caused a leaf spot of *P. pratensis*, at 25° considerable spotting and some blight (a sudden collapse and drying out of the leaf blades), at 30° severe blight and slight spotting, and at 35° very severe blight and death of some 50% of the plants, but no spotting. Some 8–10 hr. contact between spores and leaf are needed for substantial infection at 25°. Alternating low and high humidity resulted in spotting rather than blight. Symptom expression on lawns was similar to that in the greenhouse, where control was obtained with captan (0·4 lb./gal.), dichlone (0·02), and zineb (0·01) applied after inoculation. The disease could, however, also probably be checked by a change in the present practice of leaving the mown grass, which eventually forms a 2- to 3-in. mulch that increases humidity.

Malca (M. I.) & Owen (J. H.). **The gray-leaf-spot disease of St. Augustine Grass.**—*Plant Dis. Reptr*, **41**, 10, pp. 871–875, 3 fig., 1957.

Piricularia grisea is very destructive to St. Augustine grass (*Stenotaphrum secundatum*) in Florida in the summer, particularly during heavy rainfall and high humidity. At the University of Florida, Gainesville, isolates from *S. secundatum* and crabgrass (*Digitaria sanguinalis*) [**34**, p. 154] were pathogenic to both hosts on cross inoculation. The fungus penetrated *S. secundatum* through the stomata or directly through the epidermis, causing collapse of the mesophyll cells. Lesions appear first on the leaf blade as minute brown dots which enlarge to form oval, later elongated, areas generally 0·2–0·7 (occasionally up to 2) cm. long. Sporulating lesions have depressed, blue-grey centres and slightly irregular, brown margins with some marginal chlorosis. Under conditions favourable for the disease 30 or more lesions develop on a single blade, causing chlorosis and death of the leaf.

Johnson (A. G.). **Mastigosporium album Riess on Alopecurus pratensis in Nova Scotia.**—*Plant Dis. Reptr*, **41**, 11, p. 949, 1957.

M. album was observed for the 1st time in Nova Scotia, in July 1954, on meadow foxtail (*A. pratensis*). This is the second record for N. America [**34**, p. 154].

Roberts (D. A.). **Natural infection of Ladino Clover by the Red Clover vein mosaic virus.**—*Plant Dis. Reptr*, **41**, 11, pp. 928–929, 1957.

From Cornell University, Ithaca, New York, red clover vein mosaic virus [**36**, p. 34] is reported for the 1st time on white clover.

Tribe (H. T.). **On the parasitism of Sclerotinia trifoliorum by Coniothyrium minitans.**—*Trans. Brit. mycol. Soc.*, **40**, 4, pp. 489–499, 1957.

C. minitans [**26**, p. 474] was isolated for the 1st time in England from a culture of *S. trifoliorum* obtained from sclerotia collected in a clover field near Tillingham, Essex, and it has since been found in 15 of 39 sclerotial samples of *S. trifoliorum*

from Cambs., Norfolk, and Suffolk; of 31 samples from other parts of southern England only 1 (from Beds.) was infected. *C. minitans* was detected either by incubating pieces of sclerotia on a test-tube culture of *S. trifoliorum* for a month or by placing sclerotia in water for an hour and examining for patches of exuded spores; the latter method, though underestimating infection, was considered adequate. The Tillingham isolate also attacked *S. sclerotiorum* and *S. minor*, but not *S. gladioli* or *Botrytis fabae*. Infected sclerotia of *S. trifoliorum* were found in both light and heavy soils. The mycelium of the parasite grows through the sclerotial tissue, pycnidia being formed on the surface; later the sclerotium is attacked by secondary invaders and disintegrates.

In experiments on the artificial infection of buried sclerotia spore suspensions of *C. minitans* sometimes caused considerable infection but the spores tended to accumulate in the superficial layers of the soil. A cornmeal-sand culture mixed with loamy sand on heavy clay killed 85–99% of the sclerotia within 11 weeks, and *C. minitans* persisted in both soils for 14 months, possibly 2 yr. The best time to infect sclerotia by this method in the field would be during the preparation of the seed bed of the crop to be protected. Nothing is known, however, of the density of ascospores of *S. trifoliorum* required to cause infection under favourable conditions or the extent to which a 90% kill of sclerotia would be effective in controlling clover rot.

Sackston (W. E.). **Stemphylium sarcinaeforme on Red Clover in Uruguay.**—*Plant Dis. Reptr*, **41**, 11, pp. 926–927, 1957.

This is a new record for Uruguay [cf. **35**, p. 751]. *S. sarciniforme* also was found growing saprophytically on flax stems and other plant materials.

Azbukina (Mme Z. M.). Главнейшие болезни Клевера и Люцерны в Приморском крае. [The most important diseases of Clover and Lucerne in the Primorski district.]—Вопр. сельск. и лесн. х-ва Дальн. Востока [*Probl. Agric. Forest. Far East*], **1**, pp. 111–119, 1956. [Abs. from *Referat Zh. Biol., 1957*, 21, p. 164, 1957.]

The Far Eastern branch of the Academy of Science U.S.S.R. reported 7 fungi attacking red clover in Primorski in 1952–54. The most destructive was *Colletotrichum caulivorum* (anthracnose) which was controlled by seed treatment with granosan. Application of 17 kg./ha. borax to the soil decreased anthracnose and rust (*Uromyces fallens*) [*U. trifolii*: **28**, p. 336] and increased yield by 81·6%. Spraying clover in the initial stage of anthracnose (20 Sept.) with 10% $FeSO_4.7H_2O$ or 20% calcium hypochlorite also proved effective. Lucerne was attacked slightly by *Pseudopeziza medicaginis* [map 129], *C. caulivorum*, and *U. striatus*.

Cope (W. A.). **Inheritance of rust resistance in Alfalfa.**—*Diss. Abstr.*, **17**, 3, pp. 481–482, 1957.

At N. Carolina State College the inheritance of reaction to rust [*Uromyces striatus*: **28**, p. 18] was followed in 3 lucerne populations subjected to a natural epidemic. Three or 4 loci were involved and possibly 1 or more additional genes with smaller effects. Genes for resistance were partially dominant at 2 loci while those for susceptibility were dominant at 1 and possibly 2 loci. It is expected that fairly rapid progress could be made in breeding for rust resistance.

Zaleski (A.). **Reactions of Lucerne strains to Verticillium wilt.**—*Plant Path.*, **6**, 4, pp. 137–142, 1 fig., 1957.

Field observations at the National Institute of Agricultural Botany, Cambridge, of the reactions of 12 lucerne strains to *V. albo-atrum* [cf. **37**, p. 176] showed that all became naturally infected, but some more severely than others. Symptoms became more conspicuous towards the end of the season, and the disease spread more as

the stands aged. Loss of plant was greatest in the late strains, partly owing to damage by weed competition. The disease symptoms were more pronounced in the early strains when defoliated, but they recovered more quickly after cutting and sustained fewer losses than late ones. Provence had a lower mortality than most other strains. In addition to mortality, there was also wilting and drying-up of the foliage. Lucerne should be cut at the flower-bud stage, before the fungus has caused much loss.

Outbreaks and new records.—*F.A.O. Pl. Prot. Bull.*, **5**, 12, p. 193, 1957.

K. Akbar & S. F. Hassan report that, during the winter of 1956–7, many fields of *Lathyrus sativus* about 60 miles S.E. of Karachi (Pakistan) were infected by *Uromyces pisi*, not previously recorded on this host in Pakistan or India.

Graham (J. H.) & Zeiders (K. E.). **Diseases of Crown Vetch.**—*Plant Dis. Reptr*, **41**, 11, p. 925, 1957.

From the U.S. Regional Pasture Research Laboratory, University Park, Pennsylvania, it is reported that crown vetch (*Coronilla varia*), used as a soil stabilizer, is attacked by a fungus tentatively identified as *Cercospora rautensis*, producing long, irregular, reddish- to chocolate-brown lesions on stem and petioles. Two species of *Stemphylium* were recovered from large, irregular, marginal lesions with target spots. Anthracnose was caused by *Glomerella cingulata*.

Grouet (Mme D.). **Quelques observations et essais de traitement sur la rouille de la Menthe.** [Some observations and treatment trials on Mint rust.]—*Phytiatrie-Phytopharm.*, **6**, 1, pp. 23–29, 1 diag., 1 graph, 1957.

After presenting some observations on the times of appearance of the various spore forms of *Puccinia menthae* [cf. **37**, p. 244] the author reports trials at the Station Centrale de Pathologie Végétale, Versailles, in which dichlone gave good control in both the first crop and aftergrowth of Mitcham peppermint. Ziram showed promise with the first crop but inadequately protected the aftergrowth, which was exposed to heavier attack.

Chilton (J. E.). **Sesame (Sesamum indicum L.), a host for Verticillium albo-atrum Reinke & Berth.**—*Plant Dis. Reptr*, **41**, 9, p. 803, 1957.

V. albo-atrum caused a severe wilt of sesame growing in infested soil at the New Mexico Agricultural Experiment Station. This is apparently the first published record of the disease in the United States. An isolate from sesame infected both sesame and cotton soil-inoculated in the greenhouse and one from cotton was equally pathogenic.

Bazán de Segura (C[onsuelo]). **New hosts of Macrophomina phaseoli in Peru.**—*Plant Dis. Reptr*, **41**, 9, p. 814, 1957.

M. phaseoli has been found in Peru [**35**, p. 917] on castor bean (*Ricinus communis*) and a 3-year-old olive tree.

Sackston (W. E.). **Diseases of Sunflowers in Uruguay.**—*Plant Dis. Reptr*, **41**, 10, pp. 885–889, 1957.

In a survey of sunflower fields in various parts of Uruguay in 1956–7 the most destructive disease found was rust (*Puccinia helianthi*) [map 195]. Air-borne spores from Argentina [**34**, p. 189] were believed to be a source of inoculum. Leaf mottle (*Verticillium albo-atrum*) [**37**, p. 52], a new record for S. America, was found in more than half the fields. 'Peste negra' (cause under investigation) induced premature ripening and reduction of yield in occasional plants. *Albugo tragopogonis* was seen in two-thirds of the fields; head rot (*Sclerotinia sclerotiorum*) is severe when early

rains delay harvesting; root rot and wilt (*S. minor* and *Sclerotium rolfsii*) were also found. New records on sunflower for Uruguay were *Plasmopora halstedii* [map 286], *Sclerotium bataticola* [*Macrophomina phaseoli*], *Fusarium oxysporum*, *Eryisphe cichoracearum*, *Itersonilia perplexans*, [sunflower] mosaic virus, head drop (a physiological condition of unknown origin, the stems of affected plants appearing as if cut with a knife 10–15 cm. below the head), and bud blight (cause unknown).

Volosky de Hernandez (Dora). **El 'polvillo de la Maravilla' en Chile (Puccinia helianthi Schw.).** [Rust on Sunflower in Chile (*Puccinia helianthi* Schw.).]—*Agricultura téc., Santiago*, **14**, 2, pp. 95–99, 1954. [Received 1957.]

From the Departamento de Investigaciones Agrícolas, Santiago, it is reported that *P. helianthi* [map 195] was first detected on sunflower in Chile in 1954 in an area extending from Santiago to Cautin, but the attack was not important. In greenhouse tests of 240 lines of sunflower derived from resistant Canadian plants and some Chilean crosses 46 plants were resistant to the strain of rust used, of which CA–54–125–1, CA–54–125–2, and CA–54–125–5 were most promising.

Kovachich (W. G.). **Some diseases of the Oil Palm in the Belgian Congo.**—*J.W. Afr. Inst. Oil Palm Res.*, **2**, 7, pp. 221–229, 5 pl., 1 fig., 1957.

Five diseases causing a rotting of the closed spear leaves of oil palms are described. A spear rot, first observed in a nursery at Yaligimba at the end of 1954, and so far of little economic importance, has been shown to be caused by a *Phytophthora* sp., the first definite proof of a pathogen of this genus on oil palm. Crown disease [**7**, p. 164; **14**, p. 357] occurs only on palms originating from imported Deli seed; from the symptoms it is believed to be pathogenic and not physiological in origin. The fungi isolated, however, *Fusarium* sp. and *Glomerella cingulata*, did not prove typically pathogenic on inoculation, and the *Phytophthora* sp. referred to above, though reproducing the symptoms of the disease in 1 experiment, failed to do so in another.

Nursery spear rot may affect 2% of nursery palms, both of local origin and of Deli type; the symptoms are similar to those of crown disease and the same fungi were isolated, but trees are affected earlier in their development and the spear leaves do not bend over. It also resembles *Phytophthora* spear rot. Nursery bud rot was first described by Steyaert (*I.N.E.A.C., Ser. Sci.* **18**, pp. 11–13, 1939) and may attack up to 6% of the seedlings in some nurseries. Palms of 6 months and older are attacked; petiole growth of the young leaves is reduced and they may turn yellow. Clear spots are sometimes seen in lines on the basal or median leaflets of the young leaves and the spear leaf becomes entirely rotted, generally causing the death of the seedling. Internal stem symptoms, including brown streaking, also occur. This disease is suggestive of virus infection and affected palms should be rogued out.

Pre-nursery and nursery palms in 3 separate plantations have recently been affected by a leaf rot caused by *Corticium solani*. The older leaves of pre-nursery seedlings develop irregular, pale buff patches which shrink and dry up and finally coalesce and fall into shreds. Young nursery palms are usually infected at the base of the spear leaf, where irregular, pale olive-green patches surrounded by a violet-brown zone appear. These patches enlarge and turn dark brown before desiccation. In one nursery this disease was traced to the proximity of pieces of *Pueraria*, used as a mulch, infected by *C. solani*.

Robertson (J. S.). **Spraying trials against freckle, a leaf disease of Oil Palm seedlings caused by Cercospora elaeidis Stey.**—*J.W. Afr. Inst. Oil Palm Res.*, **2**, 7, pp. 265–271, 2 pl., 1957.

This is an expanded account of spraying trials for the control of *C. elaeidis* on

pre-nursery and nursery oil palm seedlings already noticed [**36**, p. 469]. All the fungicides tested were improved by the incorporation of a sticker (triton X-114). The most effective was ziram powder; 32·25% infection with sticker, 69·25% without, 92·75% on the controls.

Ferrand (M.). **La carence magnésienne dans la cuvette centrale congolaise.** [Magnesium deficiency in the Central Congo Basin.]—*C. R. Acad. Agric. Fr.*, **43**, 11, pp. 585–587, 1957.

Following an extensive tour the author reports that Mg deficiency is widespread and often severe in the left bank area of the Belgian Congo basin. Severe deficiency, which is revealed by the yellowish-orange foliage of affected oil palms [**36**, p. 401, *et passim*], is probably the cause of the poor results obtained with many crops in the area, and of the slow growth made by rubber trees.

Pupisheva (Mme L. I.). Бактериоз Хурмы. [Bacteriosis of Dates.]—Бюл. науч.-техн. информ. Гос. Никитск. бот. Сада. [*Bull. sci. tech. Inform., Nikita bot. Gard.*], *1957*, 2, pp. 39–40, 1957. [Abs. from *Referat Zh. Biol., 1957*, 22, p. 143, 1957.]

In S.E. Crimea, U.S.S.R., bacteriosis of date palms was recorded for the first time in 1951. The disease appears in spring and is most severe in June–July. The unidentified causal bacterium is specific to date palms. It cannot live more than $1\frac{1}{2}$ months in the soil. Spraying with 2% Bordeaux mixture at the beginning of May checked the disease.

Morris (H. E.) & Afanasiev (M. M.). **Potato diseases and their control.**—*Circ. Mont. agric. Exp. Sta.* 215, 37 pp., 18 fig., 1956. [Received 1957.]

Some of the common diseases and disorders of potatoes in Montana are described and measures suggested to reduce losses, which at present amount to 16% of the crop.

Wilson (J. D.), Sleesman (J. P.), & Irons (F.). **Control of foliage diseases and insects of Potatoes.**—*Bull. Ohio agric. Exp. Sta.* 788, 114+64 [unnumbered] pp., 6 fig., 1957. [46 refs.]

After a brief introduction followed by a useful key to the active ingredients of numerous fungicides, insecticides, and adjuvants normally known by trade names or ciphers, the authors present the results of annual spray trials during 1943–55 at various localities in Ohio.

Pfeffer (C.). **Das Auftreten der verschiedenen Viruskrankheiten der Kartoffel in der Deutschen Demokratischen Republik.** [Occurrence of various Potato virus diseases in Eastern Germany.]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F., **11**, 7, pp. 136–144, 6 maps, 1957. [English and Russian summaries.]

In 1950–52 seed samples of a representative series of potato varieties from the Institut für Pflanzenzüchtung, Gross-Lusewitz, were grown in all parts of E. Germany. After 1 year samples were returned to the Institute and examined for virus infection. The incidence of leaf roll, potato virus A, and potato virus Y increased from N. to S., except that mountainous regions in the S. were comparatively lightly affected [cf. **34**, p. 53].

Pfeffer (C.) & Stottmeister (W.). **Über den Virusabbau der Kartoffeln in den verschiedenen Gebieten der DDR.** [Concerning virus degeneration of Potatoes in various regions of Eastern Germany.]—Reprinted from *Dtsch. Landw., Berl.*, **8**, 8, 6 pp., 1 map, 1957.

Much of the information in this paper has already been reported [see above]. In

1953 the level of [unspecified] virus infection in tubers of Ackersegen, Mira, and Capella, grown from healthy seed in an infected area, was studied in relation to the date at which the tops were removed. In Ackersegen harvested in the normal way there was 24·6% infection compared with 8·6% in stands where the tops had been removed on or before 18 Aug. It was concluded that even in areas of severe virus infection relatively healthy seed potatoes may be obtained by removal of the tops about 8 days after the onset of a dense wave of peach aphid [*Myzus persicae*] infestation. More study is necessary, however, to determine the extent of damage to tubers in years of exceptionally early and heavy aphid infestation.

Wenzl (H.). **Virusbekämpfung im Saatkartoffelbau mittels systemischer Insektizide.** [Virus control in seed Potato cultivation by means of systemic insecticides.]—*Pflanzenarzt*, **10**, 10, p. 91, 1957.

In tests at the Bundesanstalt für Pflanzenschutz, Vienna, the spraying of seed potato crops with systemic insecticides, in the interval between emergence and the stage at which symptom development permitted roguing, prevented the spread of [potato] leaf roll [virus]. This treatment was not effective against such viruses as potato virus Y, which have no latent period in the aphid vector.

Gerola (F. M.) & Testa (G.). **Ricerche sulla fisiologia delle piante virosate. II. Attività deidrogenasica in tuberi di Patata di individui sani e virosati.** [Researches on the physiology of virus-affected plants. II. The dehydrogenase activity of tubers from healthy and virus-affected Potato.]—*Nuovo G. bot. Ital.*, N.S., **64**, 1–2, pp. 185–197, 2 graphs, 1957. [English summary.]

In further studies [**36**, p. 300] the authors investigated virus-tested potato tubers from Dutch plants, locally grown plants, and from apparently healthy and virus-affected plants obtained from the University of Milan. The dehydrogenase activity of lots of 20 pieces (1 cm. by 1 mm.) was determined, and then the oxygen consumption of smaller pieces. The inhibitors used were iodoacetate and malonate, at 5×10^{-2} and 10^{-2}. All tubers from virus-affected plants displayed a very high dehydrogenase activity at the beginning of the investigation and during washing in running water for 24 hr., whereas in healthy pieces it began at a low level and increased progressively. The results suggest that it should be possible to distinguish between healthy and virus-infected tubers on the basis of their enzymatic physiology.

Gigante (R.). **Le reazioni di tre varietà di Patate italiane in presenza del virus X, del virus Y, e del virus A.** [The reactions of three Italian Potato varieties in the presence of virus X, virus Y, and virus A.]—*Boll. Staz. Pat. veg., Roma*, Ser. 3, **14** (*1956*), 2, pp. 215–229, 11 fig., 1957. [English summary.]

In work at the Centro Studi per la Patata (L'Istituto di Allevamento Vegetale per la Cerealicoltura, Bologna), and at the Stazione di Patologia Vegetale, Rome, the Italian potato vars. Albona, Bianca di Basilicata, and Mora were inoculated by tuber-grafting with potato virus X from Eersteling [Duke of York], with virus Y from an Institut de Beauvais var., and with virus A from Allerfrüheste gelbe. Details of their reactions to these viruses are given.

Sommereyns (G.). **Note relative au virus A de la Pomme de terre chromatographié sur papier.** [A note on Potato virus A chromatographed on paper.]—*Parasitica*, **13**, 3, pp. 94–96, 1957.

Potato virus A [cf. **36**, p. 420] in non-purified sap of infected Samsun tobacco plants was deposited at the top of the paper band. After development and elution, virus A was tested for by the inoculation of young tobacco plants. The results showed that virus A migrates in the paper band. The eluates collected after chromatography

are infectious, plants inoculated with them display characteristic symptoms, and their sap precipitates in the presence of potato virus A antiserum.

Bonde (R.) & Merriam (D.). **A knobby tuber disease of the Potato.**—*Amer. Potato J.*, **34**, 8, pp. 227–229, 2 fig., 1957.

The disease here reported was first observed in experimental fields of the var. Katahdin at Aroostook Farm, Presque Isle, Maine, in 1951. Affected tubers were markedly knobbly and the plants exhibited a shortening of the internodes and a tendency to develop adventitious axillary branches. There was internal vascular discoloration in some plants. Since that time the same or a similar tuber condition has been seen in Chippewa, Cherokee, Saco, and Green Mountain, being associated in the last-named with rather spindling stems, recalling potato witches' broom virus infection, and occasionally internal vascular discoloration. The disease is sometimes tuber-transmitted but some plants from affected tubers appear to recover.

The cause of the disease is not known but it may be a virus similar to that causing spindle tuber [**33**, p. 685]. Bacteria isolated from the discoloured vascular ring of affected tubers did not reproduce the disease, but when young, healthy, actively growing Saco plants were brushed and switched with Katahdin plants infected with spindle tuber virus [**33**, p. 685] 60% of them developed spindle tuber symptoms and 40% knobbly tuber symptoms. Similar attempts at infection using Katahdin plants with knobbly tubers were, however, unsuccessful.

Dwuraźna (Mme M.). **Rozwój chorób grzybowich w hodowli Ziemniaków pod Krakowem.** [The development of fungal diseases in Potato breeding in the region of Cracow.]—*Roczn. Nauk. Rol.*, **78**, Ser. D, pp. 145–158, 9 graphs, 1957. [Russian and English summaries.]

Observations in the Cracow region, Poland, in 1947–55, on potatoes from Pomerania showed that plants affected by virus diseases (streak [potato virus Y], mosaic, leaf roll, and crinkle [X+A]) developed no symptoms of *Phytophthora infestans* even in the wet years [cf. **37**, p. 106], whereas *Alternaria solani* was most prevalent in dry or moderately wet weather and attacked plants with severe virus infection. The 2 blights frequently occurred simultaneously.

Clayson (Angela M.) & Robertson (N. F.). **Some observations on the early stages of Potato blight attacks.**—*Plant Path.*, **6**, 4, pp. 123–127, 2 graphs, 1957.

Continuing their investigations on potato blight (*Phytophthora infestans*) [**36**, p. 54], on 13 Apr. 1956 the authors inoculated the plants from 35 Eclipse tubers in a glasshouse with *P. infestans* race 4 by dipping pieces of filter paper in a spore suspension and placing them on the leaves or stems. Lesions began to appear on the leaves, stem tips, and stem bases after 7, 10, and 14 days, respectively. No overhead watering was given until 23 May, when all the infected leaves had gone. The plants were then watered for 10 min. night and morning, or in very sunny weather lightly sprayed at 11 a.m. and 2.30 p.m., and maximum ventilation was given. The 1st sporing lesions were found on 31 May, and on 1 June there were over 60. By 16 June 95% blight (by the B.M.S. scale) [**27**, p. 89] was present. Throughout there were 6 more or less continuously cloudy days, and the mean min. and max. temp. were 53±1·4° F. and 76±0·8°. The fungus apparently survived in the stem lesions for at least 3 weeks before the revival of active sporing.

In a field experiment at Cambridge 12 rows of King Edward, each of 22–23 tubers, in the midst of about ¼ acre of assorted varieties, were planted on 11 April. On 12 June, when the plants had not yet met, one plant in the centre was sprayed with spores of race 4 and covered until the next afternoon. Leaf lesions appeared on 18 June and spored on 20 June. Stem lesions were well established by 2 July; they then spread. By 6 July 28 plants had a few lesions, and 109 by 14 July. Beaumont

conditions prevailed from 12–14 and 16–21 July, and by 23 July 276 out of 348 plants were infected and the attack was then assessed at 1%; by 7 August the figure was 75%. No differences were shown by 2 hygrographs, one 2 ft. above the ground, the other in a Stevenson screen 300 yd. away. With the prevailing showery conditions, the disease spread before 14 July, though no full Beaumont periods were recorded.

Observations were also made in a 16-acre field of King Edward at Manea, in the Isle of Ely, in the central block of which a spraying trial was being conducted. In addition to the unsprayed control plots, a central strip of about 2 acres remained unsprayed. The potatoes were planted on 16–18 April and close observations on 12 rows at the east end of the field showed no sign of blight to be present up to 31 July. Two single lesions were found in another part of the field on 30 July. On 7 Aug. 8 infected leaflets were found. No blighted shoots were seen at any time and there were no primary foci; the first infections were widely scattered. By 15 Aug. nearly every plant bore about 50 lesions. A natural, primary focus about 2½ miles away was found to be well advanced on 20 July and two other probable primary foci were found on 30 July. During the week 1–7 Aug., blight was found in several fields within a radius of 1 mile.

The results obtained at Cambridge suggest that the development of a focus from an artificially inoculated plant can progress in conditions less humid than required by Beaumont criteria. The importance of showery weather, even without full Beaumont periods, in allowing the build-up of spore inoculum within a primary focus is emphasized. The number of primary foci round Manea was not high, but apparently the epidemic started by the few such foci was responsible for a blanket infection of the whole area. The few primary foci had probably existed for several weeks before their discovery. The observations indicate the desirability of lessening their number, at least by reducing the number of infected tubers planted.

Bourke (P. M. A.). **El tizón de la papa en el clima de La Serena.** [Potato blight in the climate of La Serena.]—*Agricultura téc., Santiago*, **15**, 2, pp. 82–94, 1955. [Received 1957.]

In 1955–6 the author was seconded by the World Meteorological Organization to the Government of Chile to advise on questions of agricultural meteorology. In this report he discusses the climate of the coastal region of La Serena and the weather of 1950–55 with reference to the occurrence there of potato blight (*Phytophthora infestans*) [cf. **31**, p. 572; **34**, p. 540]. The humidity requirements of the disease are met by the frequent wet morning fogs following night dew; temperature is also important. Rainfall is only a minor factor. Weather was particularly favourable to the disease in 1951; in the 4 following years it was progressively less favourable.

Humphrey (N.). **Potato blight.**—*Leafl. agric. For. Dep., St. Helena*, 6, 4 pp., 1951. [Received Jan., 1958.]

Instructions are given for the control of *Phytophthora infestans* [map 109] on potatoes. Reference is also made to a 'wilt' [unspecified] of this crop in St. Helena.

Driver (C. M.). **Infection of native Solanum species by the Potato blight fungus.**—*Nature, Lond.*, **180**, 4598, pp. 1367–1368, 1957.

It is reported from the Crop Research Division, Dept of Scientific and Industrial Research, Christchurch, New Zealand, that *Phytophthora infestans* from *Solanum aviculare* and *S. laciniatum* readily infected leaves and tubers of a number of susceptible commercial potato varieties and also the original hosts, but no hybrid carrying 1 or more immunity genes was infected.

In May 1957 races 0, 1, 4, 1,3, and 2,4 were isolated from samples collected throughout New Zealand. Both *S.* species were susceptible to all races.

It is evident that the 2 shrubs could act as overwintering hosts, being common in the N. and S., respectively.

Overwintering may also be possible in Australia, as blight has been recorded on the Australian species *S. simile* in Dunedin Botanic Gardens.

Wade (G. C.) & Williams (P. G.). **Late blight of Potatoes. A progress report of current research.**—*Tasm. J. Agric.*, **28**, 4, pp. 435–441, 1 graph, 1957.

In a field trial in Tasmania *Phytophthora infestans* on potato [**36**, p. 421] was controlled more effectively by 4:2:40 Bordeaux at 110–120 gal./acre than by zineb at 2½ lb. in 30–40 gal./acre. Protective spraying of Bismarck potatoes based on the incidence of favourable conditions, defined by the Irish Rules, brought about significant increase in yield over the unsprayed; regular fortnightly applications were even more effective.

Ullrich (J.). **Physiologic specialization of Synchytrium endobioticum.**—*F.A.O. Pl. Prot. Bull.*, **5**, 12, pp. 181–187, 1957. [29 refs.]

The author reviews and discusses the present state of knowledge concerning the physiologic specialization of *S. endobioticum* on potato in Germany [cf. **33**, p. 173; **36**, p. 781]. Outbreaks of new biotypes of *S. endobioticum* are of no economic importance to potato cultivation in Germany as a whole, as the foci are mostly outside the chief potato-growing areas.

Bojnansky (V.). **Das Auftreten und Verschwinden des von Schilberszky beschriebenen Kartoffelkrebses (Synchytrium endobioticum (Schilb.) Perc.) in der Slowakei.** [The occurrence and disappearance of Potato wart disease (*Synchytrium endobioticum* (Schilb.) Perc.) in Slovakia.]—*NachrBl. dtsch. PflSch-Dienst, Berl.*, N.F., **11**, 6, pp. 109–114, 1 fig., 2 graphs, 1 map, 1957.

Reviewing the historical data on this disease in Slovakia the author concludes that it first occurred at Hornany (then in Hungary, now in Czechoslovakia) in 1888, though it was not reported by Schilbersky until 1896. Its subsequent disappearance would appear to have coincided with a dry period from 1890–99. The next reported occurrence was at Kysuce in 1939 [cf. **18**, p. 139; **25**, p. 464].

Gedz (S. M.). Вилив мікроелементів марганцю, борю, молібдену і міді на підвищення імунитету Картоплі. [Effect of manganese, boron, molybdenum, and copper micro-elements on the increase of canker immunity in Potatoes.] —*Rep. Acad. Sci. Ukr.*, **6**, pp. 605–608, 1957.

Mn, B, Mo, and Cu, especially in combination, increased the resistance of potatoes to wart disease [*Synchytrium endobioticum*: **37**, p. 246], improved yield, and decreased the amount of diseased tubers; thus Mn+B increased total yield by 24% and that of healthy tubers by 33%.

Nelen (E. S.). Результаты изучения макроспориоза Картофеля в Приморском крае. [Results of studies on macrosporiosis of Potatoes in Primorye.]—Вопр. сель.-лесн. хоз. Дальн. Восток. [*Probl. Agric. For. Far East*], **1**, pp. 99–110, 1956. [Abs. from *Referat Zh. Biol., 1957*, 22, p. 141, 1957.]

In Primorye, U.S.S.R., *Macrosporium* [*Alternaria*] *solani* was very severe in the dry, hot summer of 1956. Effective control was obtained by spraying with 1% Bordeaux or Burgundy mixture, dinitrosulphocyanogen benzene, or 0·75% copper oxychloride. The spraying also controlled *Phytophthora* [*infestans*: **35**, p. 219], bacterial rotting, and to some extent stem canker [*Corticium solani*: loc. cit.]. Cu, Zu, Mn,

and B sulphates at more than 0·085 g. each, introduced into individual holes in the soil, increased resistance to the diseases mentioned.

Graham (D. C.), Srivastava (S. N. S.), & Foister (C. E.). **The control of Rhizoctonia solani on Potato.**—*Plant Path.*, **6**, 4, pp. 149–152, 1 pl., 3 graphs, 1957.

At the Dept of Agriculture for Scotland, East Craigs, Edinburgh, when potato tubers with negligible, thin, medium, and thick sclerotia of *Rhizoctonia* [*Corticium*] *solani* [cf. **34**, p. 394] were submitted to 10 different dips to find a rapid method of disinfection, their efficacy being judged by the subsequent germination of the sclerotia on potato dextrose agar, all the mercurial dips except PMA inhibited the germination of negligible sclerotia. The thin ones reacted variously to PMA and phenol mercuric chloride (0·1% phenol+$HgCl_2$+NaCl) but were virtually killed by $HgCl_2$ and EMC (ethoxyethylmercury chloride). The medium and thick sclerotia were, however, relatively invulnerable. Some untreated sclerotia failed to germinate.

The evidence indicates that the best control is given by EMC (0·5% sol. of a 6% product in water)+spreader (15 min.) or 1/1000 $HgCl_2$ solution (90 min.), the latter followed by washing. If the tubers with medium and thick sclerotia are first removed, control is likely to be improved, acidulated $HgCl_2$ (0·2% $HgCl_2$+1% HCl) and PMA then being reasonably effective, though giving inconsistent results. Tests showed that too long washing after mercury treatments reduced their efficiency, and that the thick sclerotia are not killed, their germination merely being inhibited by the mercury adsorbed on the dead cells of the outer layers [cf. **11**, p. 501].

Treatment will control Potato disease.—*J. Dep. Agric. S. Aust.*, **61**, 3, p. 135, 1957.

Growers of certified seed potatoes in S.E. Australia have had some difficulty in eradicating *Rhizoctonia* scab [*Corticium solani*: **30**, p. 18]. Last season, however, an acid mercuric chloride dip (4 oz. in 2 pints HCl) gave almost complete freedom from the trouble, the amount specified being sufficient for 1 ton of potatoes. The disease is mainly restricted to light sandy soils.

Kuć (J.). **A biochemical study of the resistance of Potato tuber tissue to attack by various fungi.**—*Phytopathology*, **47**, 11, pp. 676–680, 2 graphs, 1957.

At Purdue University, Lafayette, Indiana, *Myrothecium verrucaria*, *Cephalothecium roseum*, *Aspergillus niger*, *Sclerotium rolfsii*, and *Fusarium solani* f. *radicicola* were cultured on potato tuber tissue, on potato dextrose agar to which had been added extracts of either fresh potato tuber tissue, potato peel tissue, or potato tuber tissue that had been inoculated with the fungi in question, and on media prepared from fresh tuber tissue and potato dextrose agar with chlorogenic or caffeic acid added [**36**, p. 48].

On autoclaved potato slices all the fungi made good growth, but on living potato slices *A. niger* and *C. roseum* made little growth, spore germination of the former being markedly retarded, *F. solani* made fair growth, and *S. rolfsii* and *M. verrucaria* completely rotted the surface, although the last named is not a usual pathogen of potato. All made good growth on potato dextrose agar alone, or + fresh potato tuber tissue or autoclaved inoculated tissue, and so did all except *C. roseum* with non-inoculated sterile tuber tissue incubated at 72–76° F. for 72 hr. *M. verrucaria* and *C. roseum* were inhibited by the addition of peel extracts. Tuber tissue was inhibitory to *C. roseum*, but not the others. Some 48 hr. after inoculation a red halo appeared around *C. roseum* colonies with extract of peel, incubated non-inoculated tuber tissue, or inoculated tuber tissue, and *M. verrucaria* reacted similarly to peel extract.

The results of spectral analyses of the various extracts and chlorogenic and

caffeic acids and of chromatographic analysis of peel and tuber tissue inoculated with the various fungi are set out in detail, as also are the reactions of the fungi grown on media containing chlorogenic and caffeic acids. Caffeic and/or chlorogenic acid occur in extracts inhibiting *C. roseum* and *M. verrucaria*, both of which seem more sensitive than the other fungi to these substances, which may act as inhibitors, but the amount present cannot account for all the inhibitory activity.

Kuhfuss (K.-H.). **Clonostachys araucariae Corda var. rosea Preuss an faulenden Kartoffelknollen.** [*Clonostachys araucariae* Corda var. *rosea* Preuss on rotting Potato tubers.]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F., **11**, 7, pp. 144–146, 5 fig., 1957. [English and Russian summaries.]

From the Institut für Pflanzenzüchtung, Bernburg, the author reports that in late autumn, 1956, *Clonostachys araucaria* var. *rosea* [cf. **28**, p. 640] caused some heavy losses in stored potatoes in the locality. In its later stages the condition was a slimy wet rot, sometimes affecting more than half of the tuber and recalling the rot caused by *Bacterium phytophthorum* [*Erwinia phytophthora*]. Bad weather late in the growing season was thought to have favoured the disease.

Young (D. A.). **A fungus-like structure in Potato tubers and Potato tissue cultures.** —*Diss. Abstr.*, **17**, 6, p. 1199, 1957.

Fungus mycelium was present in the tubers of 60 potato varieties, 185 seedlings, and 45 *Solanum* spp. examined at the University of Wisconsin, being most common in the cortex and vascular areas of the tubers [cf. **35**, p. 839]. Hyphae were present at all stages ranging from slightly enlarged rhizomes to mature tubers. Similar mycelium was present in callus tissue cultures derived from the tubers, and its mycorrhizal nature was demonstrated by its failure to grow out from the tissue into the medium. It failed also to grow on yeast extract agar and on the medium of Robbin and Hervey, commonly used to detect contaminants in tissue cultures. Tissue cultures free from the fungus were obtained by transferring small groups of cells. Such cultures did not differ in morphology or growth rate from those in which the fungus was present. The fungus was present in tubers from plants grown from true seed under aseptic conditions and in tissue cultures derived from the stems of such plants.

Guntz (M.), Ventura (E.), & Arnoux (J.). **Action fongicide et action physiologique des traitements dans la lutte contre le mildiou de la Pomme de Terre.** [Fungicidal and physiological action of treatments in the control of Potato blight.]—*Phytiatrie-Phytopharm.*, **6**, 2, pp. 79–91, 7 graphs, 1957.

From the Centre National de la Recherche Agronomique, Versailles, the authors report on trials for the control of blight [*Phytophthora infestans*] on Bintje potatoes in 2 localities by treatment with zineb or copper oxychloride at 2 levels and at 10- or 15-day intervals. With zineb equivalent protection was afforded by 3 kg./ha. at the long interval and 2 kg. at the short. The high dose/short interval treatment was superior to both, and the low dose/long interval inferior. This underlines the need for manufacturers to state the time over which a given dose may be expected to be effective. As this clearly depends on the climatic and other conditions influencing the development of infection two doses, a strong and a weak, might be recommended according to the risk, with a statement of the estimated duration of protection given by each.

Menzies (J. D.). **Dosage rates and application methods with PCNB for control of Potato scab and Rhizoctonia.**—*Amer. Potato J.*, **34**, 8, pp. 219–226, 1957.

Information already noticed [**36**, p. 347] on *R.* [*Corticium*] *solani* and *Streptomyces scabies* in Washington is presented in greater detail.

Pieringer (A. P.). **A greenhouse method for determining the disease reaction of Potato seedlings to common scab caused by Streptomyces scabies (Thaxt.) Waks. & Henrici.**—*Diss. Abstr.*, **17**, 1, p. 5, 1957.

At Cornell University a mixture of equal parts of vermiculite and normal potting soil infested by *S. scabies* [**36**, p. 347] was superior to infested normal soil as an infection medium in testing for resistance. Infection of the soil prior to transplanting is the best method. The mixture was suitable for plants from true seed as well as those from seed tubers, and results in the greenhouse were comparable to those under field conditions favouring the disease. Over 80% of the vermiculite particles were infested, showing that the mixture provides good distribution of the organism. The addition of vermiculite to potting soil reduced the water-holding capacity of the soil without affecting the viability of *S. scabies*, but long periods of high daytime greenhouse temps. influenced soil temp. and reduced viability. The type of tuber periderm [**36**, p. 56] was a measure of the resistance to the disease. When it consisted of distinct layers of living cells the tubers were resistant but when it consisted of obviously dead cells they were susceptible.

Gigante (R.). **Un caso di pseudocancro nei tuberi di Patata.** [A case of pseudo-wart in Potato tubers.]—*Boll. Staz. Pat. veg., Roma*, Ser. 3, **14** (*1956*), 2, pp. 233–238, 2 fig., 1957. [English summary.]

In Oct. 1956 the author observed at Cesena, Italy, stored potato tubers, var. Quarantina del Molise, bearing numerous simple or complex proliferations up to 3×2 cm. of unknown etiology. The former were present on all parts of the tubers, while the latter originated at the eyes and were mostly present near the apex. Later, the proliferations were attacked by fungi and eelworms and turned black.

Starr (G. H.). **Potato ring rot information (as determined by a recent survey).**—*Amer. Potato J.*, **34**, 9, pp. 264–268, 1957.

This paper summarizes the results of a questionnaire on ring spot [*Corynebacterium sepedonicum*], addressed in July 1956 to workers in 17 potato-growing States of the U.S.A. and 2 Canadian provinces. They formed the basis of an article published elsewhere [**36**, p. 718].

Martin (W. J.). **The mosaic and similar diseases of Sweetpotato.**—*Plant Dis. Reptr*, **41**, 11, pp. 930–935, 1957. [37 refs.]

From the Louisiana Agricultural Experiment Station, Baton Rouge, the literature on sweet potato virus diseases [cf. **37**, p. 110] is reviewed, with extracts from descriptions of sweet potato mosaic [virus] disease in the United States and a chronological list of reports of diseases of this nature from various parts of the world, with their authors' descriptions.

Blazquez (C. H.) & Owen (J. H.). **Physiological studies of Dothidella ulei.**—*Phytopathology*, **47**, 12, pp. 727–732, 1 fig., 1957.

At the University of Florida, Gainesville, *D. ulei* [**35**, p. 716] was grown successfully on an agar medium containing an extract of 20 g. rubber leaves and 2·5 g. malt extract/l. and on difco Lima bean agar (23 g./l.)+200 mg. quebrachitol. On semi-synthetic media combining vitamins and amino acids the best growth was obtained with *i*-inositol+glutamine and nicotinic acid+glycine, and the best conidial production with combinations of riboflavin with glutamine, leucine, arginine, or glycine. Both spermogonia and conidia were formed on the stromatic tissue produced. Conidial germination was best at pH7–8 and at 24–28° C.; *in vitro* culture did not diminish pathogenicity to rubber.

Risdon (E. J.). **Some preliminary comments on the contamination of natural Rubber by fungicidal dusts containing copper.**—*Quart. Circ. Rubb. Res. Inst. Ceylon*, **33**, 1–2, pp. 35–38, 1957.

Despite the specification of the Rubber Manufacturers' Association that rubber treated with copper fungicidal dusts shall not contain more than 8 p.p.m. Cu, the author indicates that this is often exceeded under Ceylon conditions. In normal conditions leaching by rain is probably a major source of contamination. The data also strongly suggest that contamination occurs when dusts are used during the *Phytophthora* [*palmivora*] season on areas of rubber in tapping. Unless buyers will accept an appreciably higher Cu content, certain precautions [which are detailed] should be taken when dusting.

Mungomery (R. W.). **Division of Entomology and Pathology.**—*Rep. Bur. Sug. Exp. Stas Qd* 57, pp. 66–88, 24 fig., 1957.

In the disease section (pp. 79–88) of this report [cf. **36**, p. 352] C. G. Hughes states that P.O.J. 2878, Pindar, Q. 47, S.J. 4, and Vidar suffered 20% loss and over from sugarcane ratoon stunting disease [**37**, p. 181], and Q. 50 showed losses in 2 of the 4 trials. C[ommercial] c[ane] s[ugar] determinations, however, proved that the disease has little effect on sugar content. There was an increase in germination of shoots cut 2–9 days before hot water treatment compared with those treated on the day of cutting, the best germination being in cane cut 3–7 days before treatment. Attempts to concentrate or purify the ratoon stunting virus have been unsuccessful. Inoculations with diluted sap indicate that the virus is most concentrated in mature leaves, leaf sheaths, and stems, and less so in roots and immature tissue.

The maximum dilution found to be infective was 1:25,000. Inoculations with infected juice that had been frozen proved that the virus can survive for at least 138 days at approximately —20° C., although infectivity decreased markedly after 80–97 days' storage.

Co. 475 and Q. 66, the latter susceptible to most Queensland diseases, cannot be grown in the presence of downy mildew (*Sclerospora sacchari*) [**37**, p. 180]. Lima showed resistance to leaf scald (*Bacterium* [*Xanthomonas*] *albilineans*) [**35**, p. 327] and Q. 66 extreme susceptibility. Susceptibility to red rot (*Physalospora* [*Glomerella*] *tucumanensis*) [cf. **36**, p. 575] is likely to be overlooked in variety trials and the promising Q. 62 and Co. 475 both had to be abandoned on this account.

Sclerophthora disease [*Sclerospora macrospora*: **36**, p. 352] was found infecting several grasses, of which summer grass (*Digitaria sanguinalis*) and guinea grass (*Panicum maximum*) were new host records. Wild sorghum (*Sorghum verticilliflorum*) and elephant grass (*Pennisetum purpureum*) had previously been found diseased.

Fusarium sp. was found to be the cause of a wilt of cowpea at Bundaberg, and *Phytophthora drechsleri* a wilt of velvet bean [*Mucuna deeringiana*] in the Mulgrave area, a new record for Queensland [cf. **36**, p. 380].

Diseases.—*Rep. Hawaiian Sug. Exp. Sta., 1957*, pp. 21–25, 3 fig., 1957.

It is stated [cf. **36**, p. 351] that red rot [*Glomerella tucumanensis*] caused serious losses in fields of 38–2915 sugarcane; in inoculation tests this variety proved the most susceptible and 37–1933 the most resistant. In the laboratory BSM–11 (phenyl mercuric acetate (PMA)+potassium 2,4,6-trichlorophenate, 1:3,200), PMA (1:1,600), and tin san (bis- (tri-n-butylin) oxide, 1:8,000) were the most inhibitory. At the same concentrations BSM–11 and PMA caused only slight leaf injury when sprayed on actively growing plants. This method of control does not appear practical, however, because of the difficulties of application and the expense involved.

Transmission of chlorotic streak virus [**37**, p. 181] from diseased to healthy plants of 37–1933 and 38–2915, grown together in 25-gal. drums, occurred only in the second ratoons under wet soil conditions. The hot PMA treatment used for improving germination and controlling pineapple disease [*Ceratostocystis paradoxa*: **34**, p. 676] (50° C. for 20 min. in a 1:1,600 solution) also gave good control of chlorotic streak. There is evidence of differences in varietal susceptibility to pineapple disease.

Ratoon stunting virus disease is not spreading in the territory; the disease was severe in canes subjected to drought conditions, yield being reduced by 14·7% with normal irrigation (27 rounds) and by 33·6% with 17 rounds when infected varieties were harvested at 25 months.

Vars. 45–2608 and 48–4646 at Waialna were affected by mosaic virus [**37**, p. 181].

Steindl (D. R. L.). **Sterilizing Cane knives for the control of ratoon stunting disease.** —*Cane Gr. quart. Bull.*, **21**, 2, p. 46, 1957.

For effective sterilization of sugarcane knives contaminated by sugarcane ratoon stunting virus [**37**, p. 181] they should be scrubbed or swabbed in solutions of (minimum strength) 0·1% mirol, 1% dettol, or 2% lysol, and then soaked for not less than 1 min.

Farrar (L. L.). **Studies on the ratoon stunting disease of Sugarcane in Louisiana.**— *Diss. Abstr.*, **17**, 3, pp. 474–475, 1957.

In Louisiana not only the nodes but also the internodes (especially the first 2–4 behind the growing point) of canes affected by ratoon stunting virus present a pink discoloration [cf. **35**, p. 328]. The virus was readily transmitted by mechanical means; it remained infective for 2 days when stored at 70° F. or when diluted in distilled water (1/10,000). It can be eliminated by maintaining an internal stalk temp. of 49° C. for 2 hr. or 50° for at least 1 hr. It is inactivated *in vitro* by 50° for 20 min., 52° for 15 min., or 55° for 10 min. There are indications that heat treatments materially reduce latent red rot infection (*Physalospora* [*Glomerella*] *tucumanensis*) in addition to raising the percentage germination of the 'eyes'. The hydrogen peroxide test [**36**, p. 425] was the only one to give a consistent colour reaction.

Hughes (C. G.). **Chlorotic streak disease in Queensland.**—*Cane Gr. quart. Bull.*, **21**, 2, pp. 64–65, 1957.

A general account of sugarcane chlorotic streak disease in Queensland [**35**, p. 328], where it is now known to occur in every district except the Lower Burdekin.

Brett (P. G. C.) & Thomson (G. M.). **Present indications of the comparative yielding ability and disease resistance of the more important Sugarcane varieties of South Africa.**—*Bull. exp. Sta. S. Afr. Sug. Ass.* 3, 3 pp., 2 col. diags., 1957.

The comparative order of yielding ability (sucrose/acre) of the more important sugarcane varieties and their resistance to or tolerance of the more serious diseases are shown graphically.

Thomson (G. M.). **Gumming disease of Sugarcane in Natal.**—4 pp., 3 fig., South African Sugar Technologists' Association, 1957.

In this general account of gumming disease in Natal [**36**, p. 276] it is suggested that *Xanthomonas vasculorum* was introduced before quarantine measures were instituted some 30 years ago, but only became apparent after the susceptible var. N:Co 310, introduced 11 years ago, had come into general cultivation, coupled with abnormal weather conditions in 1956 favourable to the disease, which resulted in its appearance in the Doornkop area in the acute phase.

King (N. C.). **Gumming disease in Natal.**—*Bull. exp. Sta. S. Afr. Sug. Ass.* 1, 4 pp., 4 col. fig., 1956. [Received Dec. 1957.]

A popular account of gumming disease (*Xanthomonas vasculorum*) on sugarcane [see above].

Mathuswamy (R.) & Aravamudhan (P.). **Germination studies on stored Canes treated with and without aretan.**—*Indian Sug.*, **7**, 6, pp. 402–405, 1957.

In a field trial at the Group Factories of Messrs. Begg, Sutherland & Co., Ltd., Marhowrah, Bihar, the germination of Bo. 17 sugarcane stored for 3–6 days was improved by treatment with the organo-mercurial fungicide aretan (10 min. immersion in a solution of ½ lb./10 gal.) [cf. **35**, p. 720]. Thus, 9 weeks after planting the percentage of germination in the treated stored cane was 47–48 compared with 52 in the treated fresh and 31 in the untreated stored.

Webster (B. N.). **Report of the Pathologist for the year 1956.**—*Bull. Tea Res. Inst. Ceylon* 38, pp. 46–50, 1957.

In further experiments on the control of blister blight [*Exobasidium vexans*] of tea [**36**, p. 556] satisfactory protection was given by 3 oz. of a 50% Cu fungicide/acre and by 6 oz. of 12% Cu experimental fungicide, but no treatment equalled the normally recommended 6 oz. of 50% Cu fungicide/acre.

Villamizar J. (A.). **El mosaico del Tabaco.** [Tobacco mosaic.]—*Acta agron. Palmira*, **6**, 4, pp. 189–224, 1956. [69 refs. Received 1957.]

A general account of tobacco mosaic.

Limasset (P.). **Observations relatives au rôle des terreaux et des tabacs manufacturés dans la transmission du virus de la mosaïque du Tabac.** [Observations on the rôle of compost and manufactured tobaccos in the transmission of Tobacco mosaic virus.]—*C. R. Acad. Agric. Fr.*, **43**, 14, pp. 749–752, 1957.

In experiments at the National School of Agriculture, Montpellier, France, a plant compost mixed with chopped débris of tobacco and tomato plants infected by tobacco mosaic virus [cf. **36**, p. 140] was placed some months later in 16 large containers and treated with 3% or 6% commercial formalin solution, by autoclaving at 95° C. for 20 min., or with water only (controls). One month later tomato seed was planted in all the containers, about 200 plants emerging in each. Some weeks later intense symptoms of mosaic appeared simultaneously in all the controls and in all the plants in formalin-treated compost, the plants in steam-treated compost being healthy.

In 1957 tobacco samples from 5 brands of cigarette and 2 brands of pipe tobacco were each ground up with water and inoculated to tobacco plants. Symptoms developed 7–12 days later, and in most cases the presence of tobacco mosaic virus was confirmed [cf. **14**, p. 662].

In another experiment Virginia pipe tobacco was manipulated for 1 min. with the fingers and a leaf at the base of a young tobacco plant gently rubbed along the midrib. Twenty-one plants were treated without re-contaminating the fingers, after which the experiment was repeated. In each series 4 plants developed symptoms of tobacco mosaic after 10–13 days.

Kassanis (B.). **Some effects of varying temperature on the quality and quantity of Tobacco mosaic virus in infected plants.**—*Virology*, **4**, 2, pp. 187–199, 1957.

At Rothamsted Experimental Station, from tobacco plants inoculated with isolates of virulent tobacco mosaic virus recently derived from single lesions, avirulent

variants were obtained when the plants were kept at 36° [C.], but not when they were kept at 20° [**36**, p. 812]. The avirulent variants reached higher concentrations than the parent at 36°, though both reached about the same at 20°; only occasionally could virulent variants be isolated from tobacco plants inoculated with the avirulent ones and kept at 20°. The relative concentrations at the 2 temperatures depended on the virus strain and on the species of plant used. In tobacco plants at 36° the mosaic virus content of the sap slowly decreased.

Cochran (G. W.) & Chidester (J. L.). **Infectious nucleic acid in plants with Tobacco mosaic.**—*Virology*, **4**, 2, pp. 390–391, 1957.

At Utah State University, Logan, during the development of chromatographic techniques for the separation of components in extracts from Turkish tobacco plants infected by tobacco mosaic virus, 2 types of component, each giving typical tobacco mosaic symptoms in susceptible hosts, were separated. The first appeared to be nucleic acid and moved through cellulose without appreciable adsorption. Tobacco mosaic virus rods were not discernible in these fractions by the electron microscope.

The second infective component, identified as the virus nucleoprotein, appeared 24–48 hr. later, after the passage of 800–1,000 ml. of developing solvent carrying no infectivity. It was not eluted until the pH of the developing solvent approached 3·8–4 (near the isoelectric point of tobacco mosaic virus nucleoprotein). Typical tobacco mosaic virus rods were detected in these fractions by the electron microscope. It is thought that the mild extraction and chromatographic techniques used would not lead to the degradation of nucleoprotein, with release of nucleic acid.

The relative infectivity of the nucleic acid and nucleoprotein components appeared to vary with the age of the infections. In one experiment with an extract from a plant with a 9-day-old infection infectivity in the nucleic acid fractions appeared to be several times that in the nucleoprotein. Extracts from 6-month-old infections contained nucleoprotein fractions with infectivity several hundred times greater.

Cohen (M.), Siegel (A.), Zaitlin (M.), Hudson (W. R.), & Wildman (S. G.). **A study of Tobacco mosaic virus strain predominance and an hypothesis for the origin of systemic virus infection.**—*Phytopathology*, **47**, 12, pp. 694–702, 1 fig., 2 graphs, 1957.

At the University of California, Los Angeles, the relative increase of the U 1 (common) and U 2 (mild) strains of tobacco mosaic virus [**34**, p. 110; **37**, p. 183] within the leaves of tobacco plants inoculated with varying proportions was determined electrophoretically [**31**, p. 211]. In mature leaves inoculated with the 2 strains in ratios of 20:80, 50:50, and 80:20 the resultant proportions remained much the same, but when young leaves were inoculated U 1 tended to predominate. In leaves that became systemically infected after a mixed inoculation of a lower leaf U 1:U 2 ratios were highest in the leaves near the apical bud at the time of inoculation, the degree of U 1 predominance increasing with its proportion in the inoculum. Little virus was detected in the older leaves just above the one inoculated. Although a distinctive spotting was sometimes associated with mixed systemic infection [**14**, p. 61], symptoms varied considerably and were no guide to the relative amounts of the two strains present. Systemically invaded leaves with U 1 symptoms contained either a mixture of the 2 strains or only U 1; in those with U 2 symptoms only U 2 virus was detected.

The frequency of U 2 symptoms after mixed inoculation decreased as the U 1:U 2 inoculum ratio, the inoculum concentration, or the number of leaves inoculated was increased. In view of this it is suggested that systemic infection originates either with the egress of only a limited number of the virus particles present in the inoculated leaf, or from virus particles contributed by only a limited number of the

primary infections. Support for this hypothesis was obtained when a mathematical expression of the frequency with which systemic U 2 symptoms should appear after mixed inoculation of mature leaves was compared with the results observed.

Siegel (A.). **Ultra-violet irradiation of dry Tobacco mosaic virus.**—*Nature, Lond.*, **180**, 4599, pp. 1430–1431, 1 graph, 1957.

At the University of California, Los Angeles, the sensitivity of strain U 2 of tobacco mosaic virus [see above] to inactivation by ultra-violet light was found to be the same whether irradiated wet or dry, whereas strain U 1 increased $5\frac{1}{2}$ times in sensitivity when irradiated dry. Both strains have identical sensitivities when irradiated dry. The change in the U 1 strain is reversible. This indicates that the U 1 nucleic acid-protein combination is operative only when the virus is wet.

Panzer (J. D.). **The effect of mineral salts on local-lesion formation by Phaseolus vulgaris inoculated with Tobacco mosaic virus.**—*Phytopathology*, **47**, 12, pp. 748–751, 1 fig., 1957.

At the Ohio State University, Columbus, no lesions developed on Pinto bean plants grown during germination in Meyer's solution (*Amer. J. Bot.*, **32**, pp. 523–528, 1945), complete or without N, P, or K, and then placed as seedlings in distilled water before inoculation with tobacco mosaic virus [**36**, p. 451]. On plants maintained continuously in such solutions in distilled water numerous lesions developed after inoculation, the greatest number in the complete solution and successively fewer in those lacking K, P, and N. In similar solutions with tap water comparable results were obtained but lesions were fewer, with a max. in the absence of P. In Meyer's solution made up with varying proportions of tap water and either distilled or demineralized water the number of lesions decreased as the proportion of tap water increased. No lesions developed on plants grown in single salt solutions with N, P, K, or Fe (the 2 latter being phytotoxic) or in a micrometabolic element solution. In a cation series most lesions developed in the area of high Mg^{++} with low K^{+} and Ca^{++} and in the area of high Ca^{++} and low Mg^{++} and K^{+}. In the anion series they were most in the area of high $PO_4^{=}$ with low NO_3^{-} and $SO_4^{=}$. These results indicate the necessity of using standardized nutrient sources when making virus lesion counts.

Aubert (O.). **La nécrose des nervures, maladie à virus du Tabac.** [Vein necrosis, a virus disease of Tobacco.]—*Rev. rom. Agric.*, **13**, 8, pp. 61–63, 3 fig., 1957.

From the Stations Fédérales d'Essais Agricoles, Lausanne, the author reports that tobacco vein necrosis caused by a strain of potato virus Y [cf. **31**, p. 201; **36**, p. 503], first observed on plantations at Tessin, Switzerland, in 1953, has since been spreading, causing heavy damage on the Magadino plain in 1954 and being reported from Luganese and Mendriosotto in 1955 [**36**, p. 378]. At Changins-sur-Nyon in 1956 experimental plots of the susceptible White Burley were devastated. The properties of the virus and the epidemiology and control of the disease are briefly outlined.

Stephen (R. C.). **Barn spot disease of flue-cured Tobacco in Southern Rhodesia.**—*Phytopathology*, **47**, 11, pp. 663–668, 2 fig., 1 graph, 1957.

Studies of barn spot (*Cercospora nicotianae*) [**34**, pp. 110, 552; **37**, p. 185] by the Tobacco Research Board, Salisbury, Southern Rhodesia, showed that increase in the colouring temp. from 85 to 94° F. had little effect on disease development, above 98° progressive reduction occurred, and 102° proved the most favourable temp., higher causing leaf damage. Increase of R.H. from 85 to 100% decreased barn spot at 100°, but not at 90°. *C. nicotianae* does not grow in culture above 93° and when the wet bulb temp. (corresponding to the temp. of the leaf) is 96° or above the pathogen cannot develop in the leaf.

There was a highly significant correlation between the number of field lesions at harvest and the subsequent development of barn spot, which also tended to be worse on leaves harvested when over-ripe. It is necessary that the controlling barn conditions of 100–102° and 100% R.H. be reached quickly, as a delay of even 8 hr. results in an appreciable development of spotting. These conditions are most easily achieved in practice by the use of steam.

Apple (J. L.). **Pathogenic, cultural, and physiological variation within Phytophthora parasitica var. nicotianae.**—*Phytopathology*, **47**, 12, pp. 733–740, 2 fig., 1 graph, 1957.

A preliminary report of the results of this investigation at N. Carolina State College, Raleigh, has been noticed [**34**, p. 404]. A comparison of 225 isolates of *P.p.* var. *nicotianae* [cf. **36**, p. 358 *et passim*] from N. Carolina, other States, and Java, Sumatra, India, and Puerto Rico showed pathogenicity to vary considerably, and there was a clear difference between the strain present in the Burley-tobacco-producing areas of western N. Carolina, Kentucky, and Tennessee and another from the flue-cured tobacco areas of N. Carolina and adjoining States [cf. **34**, p. 109]. The Puerto Rico isolate and 1 from Java resembled the latter, but another from Java and the other 2 Asian isolates differed from those of the United States. It is suggested (with supporting arguments) that var. *nicotianae* has arisen from *P. parasitica* twice in the United States, each occasion producing a distinct cultural strain. The observed increase of highly pathogenic biotypes in fields of resistant varieties is probably the result of adaptive selection. Single zoospore isolates from the same culture showed pathogenic and cultural variations similar to those among natural populations.

Debbagh (K. A.). **Tobacco anthracnose: etiology, sources of resistance, and host-parasite relationships.**—*Diss. Abstr.*, **17**, 3, p. 486, 1957.

At N. Carolina State College comparative morphological and cross-inoculation studies were made on isolates of *Colletotrichum* from tobacco [**36**, p. 357], lucerne, Ladino clover, Korean lespedeza, and hop clover [*Medicago lupulina*]. Those from the 2 last-mentioned did not conform to any *C.* sp. described on the legumes [**33**, p. 637] under study. The temperature relations of the isolates from tobacco, lucerne, and Ladino clover were essentially identical. All were equally pathogenic to lucerne, but the tobacco isolate was markedly more pathogenic to tobacco than the lucerne one, which produced typical anthracnose lesions with some pin-point ones, and the Ladino clover isolate which induced pin-point lesions only. It is concluded that these 3 isolates represent 3 special forms of *C. destructivum*.

Of 25 *Nicotiana* spp. and 193 tobacco lines, *N. debneyi*, *N. glauca*, *N. langsdorfii*, *N. longiflora*, and *N. nudicaulis* proved highly resistant, while *N. megalosiphon*, *N. palmeri*, *N. stocktoni*, and *N. sylvestris* were moderately resistant. F_1 hybrids of *N. tabacum* × *N. glauca* were highly resistant when they carried one genome from each parent.

In all hosts the pathological effects of the fungus occurred in advance of penetration. The first microscopic symptoms were the swelling and deep staining of cell walls and granular degeneration of the nuclei. Then cell contents degenerated to a mass of small vacuoles surrounded by a mesh of cytoplasm. Vessels were less affected than parenchyma.

Shaw (L.) & Lucas (G. B.). **Further studies with streptomycin for wildfire control in Burley Tobacco plant beds, North Carolina, 1957.**—*Plant Dis. Reptr*, **41**, 11, pp. 939–940, 1957.

This further report [cf. **36**, p. 668] on the control of tobacco wildfire (*Pseudomonas tabacum*) notes that better control was obtained with 4 weekly applications of

either streptomycin sulphate or nitrate at 200 p.p.m. than with 100 p.p.m. or a 3–4–50 Bordeaux mixture drench. Good eradicative control was also obtained with streptomycin sulphate at 400 p.p.m. applied a week after inoculation.

Garber (E. D.) & Shaeffer (Susan G.). **Methionine biosynthesis and utilization in Pseudomonas tabaci and Ps. angulata.**—*Nature, Lond.*, **180**, 4597, pp. 1282–1283, 1957.

At the Dept of Botany, University of Chicago, 2 strains of *P. tabacum* and one of *P. angulata* were grown in a synthetic medium. Following ultra-violet irradiation and screening with penicillin, mutants of *P. tabacum* requiring methionine were isolated. All the mutants as well as the parent strains of both species were inhibited by cysteine and homoserine. *P. tabacum* was resistant to methionine sulphoximine and *P. angulata* sensitive. Six mutants of *P. angulata*, resistant to methionine sulphoxamine, did not produce a chlorotic halo in tobacco leaves. It has been possible to 'convert' *P. tabacum* to *P. angulata*, but not the reverse. From these observations on the biosynthesis of methionine it is concluded that *P. tabacum* and *P. angulata* are variants within one species.

Owen (J. H.) & Clark (F.). **Angular leaf spot of Tobacco in Florida.**—*Plant Dis. Reptr*, **41**, 9, pp. 804–805, 1 fig., 1957.

Infection by *Pseudomonas angulata* was observed during May and June 1957 in several fields of flue-cured tobacco near Newberry. Low rainfall appeared to check the spread of the disease. This is stated to be the first report of angular leafspot from Florida though *P. tabacum* has been known to occur [but cf. maps 321 and 293].

Zachos (D. G.). **Recherches sur l'interférence entre le virus de la mosaïque du Tabac et le virus X de la Pomme de Terre dans le cas de la maladie complexe de la Tomate (streak).** [Studies on the interference between Tobacco mosaic virus and Potato virus X in the case of the complex disease of Tomato (streak).] —*Ann. Inst. phytopath., Benaki*, N.S., **1**, 1, pp. 1–90, 12 graphs, 1957. [104 refs.]

The author reports a series of experiments carried out at the Institut National de La Recherche Agronomique, Station Centrale de Pathologie Végétale, Versailles, on the interaction of the two viruses concerned in streak disease of tomato [cf. **35**, pp. 245, 706], tobacco mosaic virus (TMV) and potato virus X.

Under comparable conditions virus X spread more rapidly in inoculated tomato plants than did TMV. When both were present there was interference resulting in an acceleration of the rate of spread of virus X and a deceleration of TMV. When the viruses were inoculated simultaneously or virus X was inoculated first there was interaction resulting in the intensified multiplication of virus X and partial inhibition of TMV. Where TMV was inoculated first, however, each of the viruses multiplied as it would have done alone.

In physiological studies it was found that in plants infected by either or both viruses ascorbic acid oxidase, phenol oxidase, and peroxidase activities all sank to below normal by the 5th day, rising above normal to a max. on the 12th day, and gradually falling again below normal by the 20th day. Catalase activity showed an opposite pattern. There was a close correlation between virus concentration and oxidase activity. In mixed infections where either virus was inoculated before the other each gave rise to peroxidase activity in proportion to its development. These results are discussed at length.

Cox (R. S.) & Hayslip (N. C.). **Recent developments on the control of foliar diseases of Tomato in South Florida.**—*Plant Dis. Reptr*, **41**, 10, pp. 878–883, 1957.

At the Indian River Field Laboratory, Fort Pierce, Florida, streptomycin was less

effective than copper against *Xanthomonas vesicatoria* on field tomatoes [**36**, p. 811] but a mixture of the 2 was more effective than either alone; thus in one test agrimycin (100 p.p.m.)+tribasic copper sulphate (4 lb./100 gal.) reduced disease severity to 2·2 (on a 0—11 basis) compared with 6·4 and 4·6 for the 2 materials separately. Manzate (1½ lb.) and parzate (2 lb.) provided better control of *Phytophthora infestans* [loc. cit.] than any other material tested. Dyrene (3 lb.) was the most effective against *Stemphylium solani* [loc. cit.]. Plots sprayed with phygon XL (¾ lb.), phygon-dyrene (½–2), or the same mixture +3 lb. copper and 100 p.p.m. agrimycin had the least grey mould (*Botrytis cinerea*). The last mixture caused light to moderate leaf distortion.

Graham (K. M.) & Donaldson (A. G.). **Spraying Tomatoes for the control of leaf spot, early blight and late blight.**—*Canad. J. Pl. Sci.*, **37**, 4, pp. 385–391, 1957.

In the Ottawa district early blight (*Alternaria solani*) [**30**, p. 16], leaf spot (*Septoria lycopersici*) [**35**, p. 158], and late blight (*Phytophthora infestans*) [loc. cit.] of tomato were controlled effectively by 6 applications of COCS 55 or of manzate. A schedule consisting of 3 sprays with the latter followed by 3 with COCS 55, or 6 of a tank mixture of these 2 fungicides, gave the same results as those obtained with each of them alone. Of 9 fungicides tested, some showed a degree of specificity. Vancide formulations and zerlate were less effective than the others, and tricop was not very effective against *P. infestans*.

Chancogne (Mlle M.) & Viel (G.). **Étude au laboratoire de l'efficacité de quelques fongicides sur Phytophthora infestans.** [A laboratory study of the effectiveness of several fungicides on *Phytophthora infestans*.]—*Phytiatrie-Phytopharm.*, **6**, 2, pp. 67–70, 1957.

At the I.N.R.A. Laboratoire de Phytopharmacie, Sèvres, France, fungicides to be compared against *P. infestans* were applied to the upper surface of the foliage of 4-leaved tomato plants (var. Marmande) which, with their leaves supported in a horizontal position to prevent them from overshadowing one another, were passed under a fixed atomizer. After drying for 24 hr. the plants were inoculated by placing 20 separate drops of zoospore suspension on the upper surface of the leaves and kept in a moist atmosphere. The number of patches of blight developing from 100 drops of inoculum was estimated 6 days after inoculation.

The method was not sufficiently precise to permit plotting of curves of number of patches against concentration. At the same dose of active material captan and Bordeaux mixture were equally effective and clearly superior to zineb.

Casarini (B.). **Sulla distribuzione dell' Alternaria porri (Ell.) Saw. f. sp. solani (E. et M. pro sp.) Neerg. nell' Italia centro-settentrionale. Osservazioni sulle caratteristiche fisiologiche dei ceppi isolati.** [On the distribution of *Alternaria porri* (Ell.) Saw. f. sp. *solani* (E. & M. pro sp.) Neerg. in central-northern Italy. Observations on the physiological characters of the strains isolated.]—*Ann. Sper. agr.*, N.S., **11**, 5, *Suppl.*, pp. cvii–cxv, 3 col. pl., 1957. [English summary.]

In 1953 a survey was made of about 100 plots each of tomato and potato to determine the extent of attack by *A. solani*. The fungus was found in only 4 tomato fields near Bologna and Modena and in 1 potato field near Bologna (in which the plants were also severely affected by a non-parasitic modification of the leaves). The morphological and physiological characters and pathogenicity of the strains isolated were studied. The conidia for inoculation were obtained from wound-inoculated tomato fruits, using mycelium. All the strains produced severe infection of the leaves of healthy, unwounded, potted tomato plants; inoculations of the stems and secondary and fruit-bearing branches occasionally gave rise to limited infection.

On different media the strains gave distinctive colonies which variously coloured the media; after 20 months in culture the appearance of the colonies changed and the discoloration of the agar disappeared almost completely. The strains failed to produce conidia on standard culture media, but during the first year abundant conidial production was obtained by the Klaus method, though subsequently the cultures became sterile.

Edgington (L. V.). **Temperature and nutritional studies on Verticillium and Fusarium wilts of Tomato.**—*Diss. Abstr.*, **17**, 1, pp. 22–23, 1957.

A sand-drip system was used at the University of Wisconsin for supplying nutrients to tomato plants in tests against *F. oxysporum* f. [*F. bulbigenum* var.] *lycopersici* [**36**, p. 623]. A decrease in either B or Ca caused an increase in susceptibility, but when B was increased to 10 p.p.m. to give toxicity symptoms wilt became more severe than with the opt. (0·05 p.p.m.).

In a water culture experiment both a deficiency and an excess of Mn increased susceptibility. The information on *V. albo-atrum* has already been noticed [**36**, p. 430; **37**, p. 186].

Klyushnik (P. I.). Определитель дереворазрушающих грибов. [A key to fungi damaging trees and timber.]—140 pp., 60 fig., State Publisher of Forestry, Leningrad, 1957. Roubles 5.20.

This book, intended for forestry specialists with an elementary knowledge of phytopathology, is based on literature from the U.S.S.R. and on the results of observations made all over the country. The sections on Thelephoraceae, Clavariaceae, Hydnaceae, Polyporaceae, and Agaricaceae contain keys to the genera and species and descriptions of each species. The characteristics of fungi found in houses are tabulated.

Wright (E.). **Influence of temperature and moisture on damping-off of American and Siberian Elm, Black Locust, and Desert Willow.**—*Phytopathology*, **47**, 11, pp. 658–662, 2 fig., 1 graph, 1957.

The results are given of studies at the Pacific Northwest Forest and Range Experiment Station, Portland, Oregon, during the 1930's on seedlings of American elm (*Ulmus americana*), Siberian elm (*U. pumila*), black locust (*Robinia pseudoacacia*), and desert willow (*Chilopsis linearis*) [cf. **16**, p. 572; **24**, p. 38]. Greenhouse tests showed that although there was somewhat more damping-off in soil at 95% moisture capacity than at 50%, the differences were not significant. *Pythium ultimum*, however, proved much more destructive to all the species in wet than in drier soil, but the latter yielded twice as many *Fusarium* isolates as the former. *R. pseudoacacia* was highly susceptible to *P. ultimum*, *C. linearis* to *Rhizoctonia* [*Corticium*] *solani*.

Pre-emergence losses of *U. americana* and *C. linearis* tended to increase with low soil temp. (15° C.). At 29°, the highest temp. tested, *Corticium* was more pathogenic than *Pythium*. Growth rates of the pathogens *in vitro* and the degree of damping-off at comparable temps. appeared to be unrelated.

Milatović (Ivanka). **Palež lišea Divljeg Kestena.** [Leaf blotch of Horsechestnut.] —*Zasht. Bilja* (*Plant Prot., Beograd*), *1956*, 38, pp. 109–111, 2 fig., 1956. [English summary. Received 1958.]

Leaf blotch (*Guignardia aesculi*) of horsechestnut [cf. **35**, p. 247] caused serious defoliation among some shade trees and in a nursery in Yugoslavia in 1956. *Diplodina castaneae* on chestnut [cf. **36**, p. 673] and *Cercospora microsora* on lime [*Tilia*] were also observed.

Cash (Edith K.) & Waterman (Alma M.). **A new species of Plagiostoma associated with a leaf disease of hybrid Aspens.**—*Mycologia*, **49**, 5, pp. 756–760, 1 fig., 1957.

In the summer of 1954 a severe outbreak of leaf diseases occurred in aspens (*Populus tremuloides* and *P. grandidentata* and hybrids) near Petersham, Massachusetts. In Sept. many leaves that had escaped infection by *Ciborinia whetzelii* [cf. **35**, p. 404] developed a reddish- to chocolate-brown discoloration. In the spring of 1955 overwintered fallen leaves were found to contain perithecia 150–200 μ long $\times$ 100–150 μ wide $\times$ 50–100 μ high, with a conical, lateral beak 40–50 $\times$ 25–30 μ, which pierced the lower leaf surface at right angles. The thin-walled asci were 35–40 $\times$ 10–12 μ and the hyaline, ellipsoid-clavate ascospores 11–13 $\times$ 4–6 μ and 1-septate near the base, the basal cell being 2–3 μ long and about the same diam. The fungus is named *Plagiostoma populi* Cash & Waterman.

Darpoux (H.), Ridé (M.), & Bondoux (P.). **Apparition de foyers d'"Endothia parasitica' sur Chataigniers en France.** [Appearance of foci of *Endothia parasitica* on Sweet Chestnut in France.]—*C. R. Acad. Agric. Fr.*, **43**, 12, pp. 670–674, 1957.

The authors report from the Station Centrale de Pathologie Végétale, Versailles, that in Sept. 1956 *E. parasitica* was recorded on about 2,000 chestnut trees in the region of Vals-les-Bains and d'Aubenas, Ardèche, and on about 30 roadside trees in the Basses-Pyrénées. Inspection of groves will be followed by the felling of affected trees and disinfection with sodium dinitrophenate, in accordance with the ministerial order of 1 Apr. 1957. The origin of the infection is not known [cf. **34**, p. 759; **36**, p. 434].

Salerno (M.). **Un parassita fogliare di Eucalyptus spp. (Cercospora eucalypti Cooke et Massee) nuovo per l'Italia.** [A leaf parasite of *Eucalyptus* spp. (*Cercospora eucalypti* Cooke & Massee) new for Italy.]—*Ital. for. mont.*, **12**, 3, pp. 3–5, 2 fig., 1957. [French summary.]

In Oct. 1956 a spotting of the leaves and twigs of *E. globulus* and of the leaves of *E. rostrata* growing near Syracuse, Sicily, was caused by *C. eucalypti* [cf. **33**, p. 635]. This appears to be a new record for Europe.

Toole (E. R.). **Twig canker of Sweetgum.**—*Plant Dis. Reptr*, **41**, 9, pp. 808–809, 1 fig., 1957.

Botrysphaeria ribis, associated with stem canker of *Liquidambar styraciflua* near Stoneville, Mississippi, was found to be pathogenic on wound inoculation but appears harmful only to weakened or shaded twigs and branches.

Fergus (C. L.) & Stambaugh (W. J.). **An irregular and unusual formation of mycelial mats by Ceratocystis fagacearum.**—*Mycologia*, **49**, 5, pp. 761–766, 9 fig., 1957.

An abnormal pad formation by *C. fagacearum* [cf. **32**, p. 701; **35**, p. 54, *et passim*] found on an inoculated black oak at the Pennsylvania Agricultural Experiment Station in Aug. 1956 consisted of single pad tissue only, partially embedded in the bark. The bark outside the pad had cracked, and there was the characteristic odour of a typical mycelial mat. These pads occurred at 8 different places on the tree, in the cambial region of which 13 normal mats were also present.

Histological studies showed that the internal composition of the irregular pad consisted of prosenchyma instead of the pseudoparenchyma of a normal pad. Large, rounded bodies were observed in most sections. Invasion of the secondary phloem surrounding the irregular pad was much more extensive than in normal formations. The exact nature of the rounded bodies is unknown, but similar

rudimentary or abortive perithecia also developed in a selfed culture of *C. fagacearum* [cf. **32**, p. 110].

Boyce (J. S.). **Relation of precipitation to mat formation by the Oak wilt fungus in North Carolina.**—*Plant Dis. Reptr*, **41**, 11, p. 948, 1957.

It is noted from the U.S. Dept Agric., Forest Service, Asheville, N. Carolina, that the drying of felled oak trees attacked by *Ceratocystis fagacearum* [see above] and subsequent mat formation was related to the rainfall during Aug.–Dec. More late winter and spring mat formation occurred on summer-felled wilt trees after a wet autumn than after a dry one. After a wet period summer-felled trees, sprayed with the bark intact to control wilt [cf. **34**, p. 267] should be sprayed again early the following year.

Fergus (C. L.) & Wharton (D. C.). **Production of pectinase and growth-promoting substance by Ceratocystis fagacearum.**—*Phytopathology*, **47**, 11, pp. 635–636, 1957.

Investigations at Pennsylvania State University, University Park, showed that in liquid culture on modified Richards' and modified Czapek's media *C. fagacearum* produced no ethylene, but did produce a growth-promoting substance that caused inward curvature of split stems of pea seedlings. No pectin methylesterase or polygalacturonase were produced, but pectin depolymerase, as determined by viscosity changes of pectin solutions, was produced *in vitro*. There is, however, no evidence as yet of the production of this enzyme or the growth-promoting substance in wilting oaks [cf. **33**, p. 268].

Turk (F. M.). **The biological relationship between the Oak wilt pathogen Endoconidiophora fagacearum Bretz. and the fungi found in wilted Oak trees.**—*Diss. Abstr.*, **17**, 3, p. 459, 1957. [Received 1958.]

Investigations at the University of Minnesota showed that *E.* [*Ceratocystis*] *fagacearum* survived 10 months in wilted red oak trees, standing or felled, and was most persistent at the bases of the trees. It was never isolated where the moisture content had fallen below 35% [cf. **36**, p. 560], nor where there was heavy invasion by *Nummularia bulliardi*. In wood blocks cut from infected trees it survived more than 32 days when stored at 3° C., but less than 24 hr. at 35°.

Of 31 fungi examined for antibiotic effect on *C. fagacearum* 8 proved inhibitory and were tested more extensively. *Trichothecium roseum* inhibited mycelial growth, distorting the young hyphae; the filtrate from an extract of this fungus inhibited endoconidial and ascospore germination at 3 ml./100 ml. water. Perithecial formation in culture was prevented by spraying with a filtered extract or with spores of *T. roseum*. Max. antibiotic production was achieved by growth on liquid malt at 28° for 3 weeks.

N. bulliardi overran and inactivated *C. fagacearum* in plate cultures; red oaks, inoculated from cultures thus overrun, were not infected.

Vlasov (N. A.). Два вида мучнистой росы. [Two mildew fungi.]—Лесн. х-Ва. [*Lesn. Khoz.* = *For. Husbandry*], *1957*, 2, p. 28, 1957. [Abs. from *Referat. Zh. Biol.*, *1957*, 20, p. 177, 1957.]

Oak trees in the European part of U.S.S.R. and Kazakh S.S.R. have been severely attacked by *Microsphaera alphitoides* and *M. silvatica*, which differ in the size and formation of the conidia. Control measures should be concentrated on the first as *M. silvatica* is much less harmful.

Scurti (J. C.). **Sul marciume del Pioppo causato da Trametes albida var. serpens e osservazioni sull' attività biochimica del fungo.** [On the Poplar rot caused by

Trametes albida var. *serpens* and observations on the biochemical activity of the fungus.]—*Boll. Lab. sper. Fitopat., Torino*, N.S., **19** (*1956*), 2, pp. 135–142, 1 pl., 1957.

A description is given of a reddish-brown, later whitish, rot of the heart-wood of Euro-American poplar hybrids in Italy, caused by *T. albida* var. *serpens* [cf. **36**, p. 441], apparently not previously recorded in Italy. The fungus is considered to belong to the white rot group.

Wright (E.). **Cytospora cankers of Cottonwood.**—*Plant Dis. Reptr*, **41**, 10, pp. 892–893, 2 fig., 1957.

A comparison of 2 cottonwood (*Populus deltoides*) plantations near Orchard, Nebraska, yielded further evidence that *Valsa sordida* is not a virulent parasite but an invader of trees in declining vigour [**19**, p. 623]. On a site with abundant subsoil moisture where root development was profuse there was no infection, whereas numerous cankers were found on trees with poor roots growing in an area with restricted subsoil moisture.

Wilson (E. E.), Starr (M. P.), & Berger (Joyce A.). **Bark canker, a bacterial disease of the Persian Walnut tree.**—*Phytopathology*, **47**, 11, pp. 669–673, 2 fig., 1957.

A hitherto apparently undescribed disease of Persian (English) walnut was observed in the Sacramento Valley of California in 1955 and studied by the University of California, Davis. Irregular, large, shallow, dark brown necrotic areas form in the trunk and scaffold branches, originating as small circular spots in the cortical tissue just below the phelloderm; they enlarge and coalesce. The cankers expand in the summer, but are inactive in winter. Hartley, Mayette, and Payne are among the varieties affected, whereas the widely planted Franquette appears to be resistant. The bacterium, found in large numbers, and shown by inoculation to be the causal organism, is Gram —, peritrichous, and non-pectinolytic; it is related to *Erwinia amylovora*, from which it differs in giving acid from rhamnose, raffinose, and cellobiose, in being unable to utilize citrate, and in other biochemical characters. It is distinguished as a new species, *E. nigrifluens* Wilson, Starr, & Berger. It failed to induce symptoms on a number of inoculated hosts; small lesions produced on almond subsequently became inactive.

Vail (J. W.), Calton (W. E.), & Strang (R. M.). **Dieback of Wattle—a boron deficiency.**—*E. Afr. agric. J.*, **23**, 2, pp. 100–103, 1957.

In 1954 an investigation was begun by the Government Chemists' Dept, Dar-es-Salaam, in collaboration with officers of the Colonial Development Corporation, into a die-back of black wattle (*Acacia mollissima*) at Mjombe, Southern Highlands Province, Tanganyika Territory. The trees are generally first affected during their 2nd dry season after seeding, when 18–22 months old, but a few develop symptoms in their 1st or 3rd. The condition becomes noticeable in July or August, some 2 months after the rains finish, and with their renewed onset in Nov.–Dec. outbreaks cease. It occurs sporadically in the vulnerable-age class and spreads erratically, but tends markedly to occur in patches.

The first outward sign is the death of the main shoot apex, followed by that of the branch apices. Defoliation and death then spread steadily downwards and inwards. If the rains start before a tree is dead it will produce fresh leaders, but these are affected in subsequent dry seasons until the tree succumbs. Microscopic examination showed that the cambial cells in the region of the apical meristems and of the root collar collapse into a brown mass. This necrosis spreads along and around the stem until the tree dies or the first rains check the disease.

The leaves of affected trees contained only 7·2 p.p.m. boron, as compared with 20·4 for healthy trees from another site. In an experiment in which trees 18 months old were sprayed in May and Aug. with B, Zn, and Mo, separately and in combination, and were given (in May only) soil applications of double superphosphate or ammonium sulphate, and both together, the groups given no spray and those sprayed with Mo, Zn, Zn and Mo, B, B and Zn, B and Mo, and B, Zn, and Mo had, respectively, 32·5, 47, 45, 34, 0, 0, 0, and 0% trees affected by die-back. Incidence in controls receiving neither spray nor soil treatment was 15–65%. These results indicate that boron deficiency is responsible for the condition. Further investigations are in progress.

Grasso (V.). **Nuovi rinvenimenti di ospiti con Coryneum cardinale.** [New host discoveries for *Coryneum cardinale*.]—*Boll. Staz. Pat. veg., Roma*, Ser. 3, **14** (*1956*), 2, pp. 239–242, 2 fig., 1957. [English summary.]

In Jan. 1957 *Cupressus arizonica* near Florence was observed to be infected by *Coryneum cardinale* [cf. **35**, p. 498], apparently a new host record for Italy.

Loring (L. B.) & Smithson (Harriet). **Phytophthora cinnamomi Rands apparently parasitic on two Juniper varieties.**—*Plant Dis. Reptr*, **41**, 9, p. 815, 1957.

P. cinnamomi was isolated from stem lesions [cf. **34**, p. 4] on 2 juniper varieties, one probably *Juniperus sabina* var. *tamariscifolia*, the other not clearly identified, in an Oregon nursery.

Manners (J. G.). **Studies on Larch canker. II. The incidence and anatomy of cankers produced experimentally either by inoculation or by freezing.**—*Trans. Brit. mycol. Soc.*, **40**, 4, pp. 500–508, 4 pl., 1957.

Most of the results of these further studies [cf. **34**, p. 6] have been noticed [**35**, p. 557]. It is concluded that *Trichoscyphella willkommi*, as well as frost, is responsible for the production of cankers on European larch (*Larix europea*) in the field [**36**, p. 795].

Boyce (J. S.). **The fungus causing western gall rust and Woodgate rust of Pines.**—*For. Sci.* **3**, 3, pp. 225–234, 1957.

Inoculation experiments (by wounding) at the Botanical Garden of Yale University showed that Woodgate rust [**30**, p. 143] inducing galls on Scots pine [*Pinus sylvestris*] and well known in the N.E. United States and E. Canada, is caused by *Peridermium harknessii*, which is common on *Pinus ponderosa* and digger pines [*P. sabiniana*] in western N. America [**5**, p. 264], where it also infects lodgepole pine (*P. contorta* [var. *latifolia*]). It has been inoculated by York [**6**, p. 195] into other pines and apparently the same fungus has been found on jack pine [*P. banksiana*] in Quebec. These are all pines of higher altitudes whereas at lower elevations in California similar galls on Monterey pine [*P. radiata*] and others are caused by *Peridermium* (?) *cerebroides* [**12**, p. 68].

Moriondo (F.). **Occurrence of Phacidium pini-cembrae on Swiss Stone Pine in Italy.**—*F.A.O. Pl. Prot. Bull.*, **6**, 2, pp. 22–23, 2 fig., 1957.

Since 1951 young *Pinus cembra* trees in the province of Bolzano, Italy, have been affected by a serious blight, caused by *Phacidium pinicembrae* [cf. **37**, p. 188]. The disease is particularly severe on mountain slopes with a N. or N.E. aspect over the highest area of the Isarco valley, where it is reported to be widespread. The fungus kills the lower portions of young trees, and sometimes causes the death of branches of older trees if near to the ground. This is the first record of the fungus on the southern side of the Alps.

Also obtainable from the

COMMONWEALTH MYCOLOGICAL INSTITUTE

COMMONWEALTH PHYTOPATHOLOGICAL NEWS

A quarterly giving news and views of current phytopathological matters in the Commonwealth. Annual subscription 5*s.* post free. Single numbers 1*s.* 6*d.*

INDEX OF FUNGI (formerly SUPPLEMENTS TO THE REVIEW OF APPLIED MYCOLOGY)

Published twice yearly. Subscription 10*s.* per annum.

Vol. 1 Index and Title-page, 25*s.*

Vol. 1 bound complete with Index, price £6. 5*s.*

Vol. 1, parts 1 to 20, and Vol. 2, parts 1 to 14, 5*s.* each.

PETRAK'S LISTS of new species of fungi reprinted from Just's *Botanischer Jahresbericht* for 1920–39 with INDEX PARTS 1 and 2 now available. Prices on application.

DISTRIBUTION MAPS OF PLANT DISEASES

A SERIES of maps showing the world distribution of major plant diseases is now being issued at the rate of two maps each month. New maps and new editions of maps are published periodically. The subscription price is 7*s.* 6*d.* per annum, post free. Back issues, in series, 6*d.* each; odd numbers 9*d.* each, postage extra. Loose-leaf binders for the maps are now available, price 20*s.*, postage extra. Maps 1 to 350 available to the end of 1957.

MYCOLOGICAL PAPERS

No. 62. A REVISION OF THE BRITISH HELOTIACEAE IN THE HERBARIUM OF THE ROYAL BOTANIC GARDENS, KEW, WITH NOTES ON RELATED EUROPEAN SPECIES. By R. W. G. DENNIS. 216 pp., 1 pl., 179 figs., 1956. 60*s.*

No. 63. PRELIMINARY LIST OF PLANT DISEASES IN NORTHERN RHODESIA. By E. A. RILEY. 28 pp., 1 map, 1956. 9*s.*

No. 64. USTILAGINALES OF WEST PAKISTAN. By S. AHMAD. 17 pp., 8 figs., 1956. 6*s.*

No. 65. SOME SPECIES OF CORYNESPORA. By M. B. ELLIS. 15 pp., 8 figs., 1957. 6*s.*

No. 66. SOME SPECIES OF DEIGHTONIELLA. By M. B. ELLIS. 12 pp., 6 figs., 1957. 5*s.*

No. 67. HAPLOBASIDION, LACELLINOPSIS, AND LASCELLINA. By M. B. ELLIS. 15 pp. 9 figs., 1957. 6*s.*

No. 68. STUDIES OF PYRENOMYCETES: I. FOUR SPECIES OF CHAETOSPHAERIA, TWO WITH CATENULARIA CONIDIA. II. MELANOPSAMMA POMIFORMIS AND ITS STACHYBOTRYS CONIDIA. By C. BOOTH. 27 pp., 7 figs., 1957. 9*s.*

No. 69. SOME SPECIES OF TERATOSPERMA. By M. B. ELLIS. 7 pp., 5 figs., 1957. 3*s.*

No. 70. CLASTEROSPORIUM AND SOME ALLIED DEMATIACEAE—PHRAGMOSPORAE. I. By M. B. ELLIS. 89 pp., 63 figs., 1958. 30*s.*

PHYTOPATHOLOGICAL PAPERS

No. 1. LOSSES CAUSED BY PLANT DISEASES IN THE COLONIES. By G. WATTS PADWICK. 60 pp., 28 figs., 1956. 10*s.*

No. 2. WITCHES' BROOM DISEASE OF CACAO. By R. E. D. BAKER and PAUL HOLLIDAY. 42 pp. 14 plates, 10 figs., 1957. 12*s.* 6*d.*

Numbers are issued at irregular intervals. Until further notice a rebate of 33⅓ per cent. is allowed on new Papers to those who register for all numbers as issued, the charge to subscribers to the *Review of Applied Mycology* being added to their subscriptions for the succeeding year, others being billed annually. A binding-case for Mycological Papers 1–25 is now available, price 5*s.*, postage extra.

THE REVIEW OF APPLIED MYCOLOGY

THE subscription to the *Review* for the current volume is 70*s.* per annum, post free, payable in advance. Back volumes can be supplied, but the price is 80*s.* per volume, postage extra, with the exception of a few parts, which are out of print. Microfilm copies of the volumes out of print can be supplied to order.

ALL publications are post free and, with the exception of Mycological and Phytopathological Papers, all subscriptions are payable in advance. Foreign subscribers should pay by International Money Order or through the British Agents of their Bankers. Orders and correspondence should be addressed to the DIRECTOR, COMMONWEALTH MYCOLOGICAL INSTITUTE, FERRY LANE, KEW, SURREY.

CONTENTS

AUTHORS' NAMES

SUBJECT INDEX